

**THE PERENNIAL CRISIS OF THE AIRLINE INDUSTRY:
DEREGULATION AND INNOVATION**

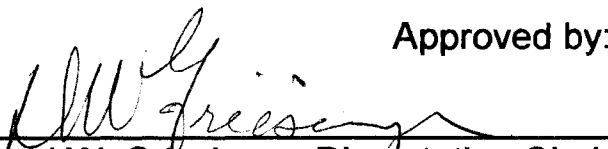
BY

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ABSTRACT

This dissertation investigates whether the financial viability of the US airline industry is best aided by innovation and deregulation as free market theorists advocate, or by reregulation and public subsidy as empty core theorists insist is necessary. To this end, the complex histories of two radical innovations in the airline industry are traced since the Airline Deregulation Act of 1978 to assess their impact on the industry's financial performance, namely Computer Reservation Systems and Hub and Spoke Systems.

Economic theory, strategic analysis, and institutional theory are used in this study to assess the competitiveness and economic viability of American Airlines, Continental Air Lines, Delta Air Lines, Southwest Airlines, and United Air Lines, subsequent to deregulation in 1978. Although the predicted link between crisis and innovation is confirmed, this study concludes that free markets and deregulation as currently practiced lead to an empty core and the probable demise of the airline industry as we know it today. In theory, radical innovations used as key resources allow innovators to gain above industry rents, create barriers to entry, and develop follow-on innovations. However, these benefits have too often been subverted in the airline industry due to antitrust confiscation of innovators' competitive advantages and profits. Consequently, government intervention and other institutional forces have often negated radical innovation as a possible way out of the empty core.

Policy alternatives for dealing with these realities inevitably involve tradeoffs with other national priorities such as national security, safety, economic

prosperity, environmental protection, energy conservation, service to all parts of the country, airport and airspace infrastructure, and antitrust, which further complicate the policy landscape. This research reveals that the institutional complexities of the industry are so far reaching that simple solutions are illusive, and argues, therefore, that simplistic characterizations of free markets versus regulation are no substitute for a deeper understanding of the diverse institutional and political forces shaping this industry. Taken as a whole, this dissertation offers a more comprehensive account of the complexities of this strategically important industry and the factors that must be accounted for in fashioning robust policy to alleviate the industry's perennial crises and stave off its imminent collapse.

DEDICATION AND ACKNOWLEDGEMENTS

I hereby dedicate this dissertation to my husband, Henri Chatelin, and my son, Jason, without their support this dissertation would not have been possible. I also dedicate this dissertation to my professors, especially Don Griesinger, who exhorted me to modify my dissertation as important findings became known, and to my undergraduate economics professor and life-long friend, Sue Van Atta, who encouraged me to pursue a doctorate and expand my intellectual curiosity. I wish to recognize my fellow colleague, David Hernandez, who supported me in this long endeavor, and completed two doctorates in the time it took me to complete one. Finally, I wish to acknowledge my editor, Leslie Light, for her innumerable hours of toiling over my dissertation.

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SECTION 1

CHAPTER 1

THE AIRLINE INDUSTRY SINCE DEREGULATION

When the public speaks of the US airline industry, it is with great disdain. In fact the US airline industry is on the list of “Industries You Love to Hate” (Kirdahy, 2008). According to the Reputation Institute, a research and consulting firm in New York City, the airline and aerospace industry is rated among the worst in consumer consideration (Kirdahy, 2008). In contrast, travelers who flew in the 1960s longingly recall the “Golden Age of Flying,” and books and plays such as *Coffee, Tea or Me?* and “Boeing, Boeing” reveal the glamour of the industry (Higgins, 2008a). What changed?

From the inception of the airline industry in the 1920s through today, the industry has often lurched from one crisis to another:

- In the 1930s, many airlines were near bankruptcy and service was unreliable, forcing the US to regulate the industry to ensure on-going services.
- In 1978, Congress passed the Airline Deregulation Act (Deregulation) that removed government oversight of three regulated areas — entry and exit into markets, pricing, and scheduling — in reaction to the financial stagnation of the industry, supporting a national desire to improve customer choice and costs, and to encourage innovation.

- The 1991 recession caused losses to the industry that “wipe[d] out all the cumulative profits earned in [the] entire industry history” (Standard & Poor's, 1992).
- In 2001, following the terrorists attacks on the World Trade Center in New York City on September 11th (9/11 terrorist attacks), the subsequent 2001 recession, and Gulf War II, five of the ten largest airlines (Majors)¹ went bankrupt. The government provided the industry with \$40.4 million in subsidies and pension relief.
- The housing and liquidity crises², the inability of even the most highly rated corporations to obtain credit, let alone the poorly rated airline industry, the 2008 recession, and high fuel prices will lead to further airline bankruptcies, as the balance sheets of most airlines have not recovered from 2001. Majors are expected to lose \$5.2 billion in 2008 (Raine, 2008), with the very survival of the industry at stake.

Are we back to the 1930s, plagued with unreliable air service and many airlines near bankruptcy?

In the context of the continuing financial troubles of the industry, this dissertation asks the basic question of the need for and role of regulation to save the industry versus the ability of the airline industry to innovate out of its crises.

The Path to Deregulation

The predecessor of the Civil Aviation Board (CAB) was created under the Civil Aeronautics Act of 1938 to provide the industry stability with fixed fares, minimum profits, and limited competitive entry. Upon its inception, CAB refused to grant routes to new trunk airlines³ and the number of trunk airlines shrank from 16 in 1938 to 10 by 1974. No airline was allowed to fail: they were instead merged with healthier airlines. CAB awarded monopoly-like routes to one or two airlines and forced airlines to cross-subsidize short, lightly traveled routes with more profitable, longer, densely traveled routes (US GAO, 1990a).

In the 1960s and 1970s economists began to question the value of continued regulation of the industry amid concerns over its poor financial health. They expressed a desire to encourage innovation in the industry and to provide consumers more choice of efficient, high quality, low fare services. Economists and CAB used intrastate airlines Pacific Southwest Airlines (PSA) and Southwest Airlines (Southwest) as deregulation models, showcasing their low fares, ample profits, and light regulation by state regulators. Economists drew upon the free market view, where markets determine price and profits and unlimited competitive entry by new entrants (New Entrant⁴) eliminates weak competitors. This process of “creative destruction” (Schumpeter, 1934) and innovation was thought to lead to a healthier mix of airlines and a robust industry.

Alfred Kahn, CAB Chairman, said he had:

... a healthy respect for the efficiency of markets ... [and a goal] to remove the meddling, protective and obstructionist hand of government, and to restore this industry ... to the rule of the market... Freedom of entry is the heart of competition... It is the essential function of competitive entry to

eliminate the super-normal profits ... that have served in part to subsidize services on uneconomic routes (Kahn, 1978, pp. 35-36).

Kahn also wanted to eliminate the strict adherence to formal, appealable decisions which eliminated "a competitive or innovative step ... [and] run directly counter to the requirement of competition and risk-taking innovation..." (Kahn, 1978, p. 35). Deregulation's justification was "...economic regulation of the airlines was inappropriate. The airline industry appeared to be inherently competitive and exhibited none of the characteristics of an industry that normally required regulation"⁵ (US GAO, 1990a, p. 22) because airplanes were highly mobile (US GAO, 1991).

In general, Deregulation's goal was to allow the free market to provide consumers with choices between more efficient, lower cost services at higher quality levels. The market would create new products and services, and innovators would be rewarded by greater demand for their products or services and thus, greater profits. This dissertation compares Deregulation's goal with the reality of the last thirty years.

About This Study

The US airline industry has been unregulated, regulated, and deregulated over the span of eighty years. During that period, the industry has become increasingly important to the US economy, directly and indirectly responsible for approximately 10% of the Gross Domestic Product (GDP) (Flint, 2001). Total spending by all forms of government on transportation infrastructure and services was \$1.3 trillion or 17% of GDP (Winston, 1999). However, these numbers do not

do justice to the importance of the airline industry in an increasingly globalized world. Airlines are a critical component of the supply chain, moving supplies, managers, and passengers around the world. They are also crucial to the security and defense of the country. Air service not only provides businesses with connections to the world, but also connects the government and communities that would otherwise be isolated.

The purpose and scope of this research is to analyze and understand several things about the US airline industry: industry viability over the long run; crisis and innovation, particularly radical innovation which creates opportunities to change the industry in frame breaking ways; institutional forces inhibiting or accelerating change; and the role of deregulation in the airline industry to further ideas of free markets versus the countervailing empty core theory.

Two Divergent Viewpoints: Free Markets versus the Empty Core

As suggested by the title of this research, *The Perennial Crisis of the Airline Industry: Deregulation and Innovation*, the fundamental question is this: Why is the industry perpetually in crisis? The almost-complete collapse of the airline industry led to its regulation in the 1930s. However, by the 1960s, significant build up of regulatory bureaucracy and inefficient airline operations, combined with a lack of innovation, caused policy makers to search for alternatives to regulation, which led to deregulation and free markets as the industry's solution. Now, after nearly thirty years of deregulation, the industry is again near collapse. Why can we not solve the airline industry's crises? Is there something fundamental about the industry that generates crises? The research

seeks to address that issue by comparing and contrasting ideas from free market proponents (S. Morrison & Winston, 1989; Winston, 1998, 1999) and empty core theorists (Telser, 1978, 1987) and a review of the industry's financial performance since Deregulation.

The free market view and deregulation have become the cornerstone of US regulatory policy over the last three decades and has been vigorously expanded to other industries, such as utilities, telecommunications, railroads, trucking, and banks, and has been exported abroad. Airline free market proponents encourage more competition in domestic and international routes, greater foreign ownership of US airlines⁶, privatization of airports and air traffic control, removal of regulatory sunk costs, and elimination of competitive barriers created by the institutional patterns of behavior of stakeholders (e.g., regulators, airlines, unions, creditors, airport authorities). Deregulation continues with Open Skies⁷ agreements and the proposed auctioning of landing and take-off slots at the three New York City – New Jersey airports — John F. Kennedy International Airport (JFK Airport), La Guardia Airport (La Guardia Airport), and Newark Liberty International Airport (Newark Airport) (Wald, 2008d).

The empty core theory (Telser, 1978) provides an opposing viewpoint.

Telser, in describing the chaotic conditions of the industry, said:

What is chaos? It does not mean that people run aimlessly in circles wringing their hands in despair. It does mean that under the existing rules and practices what happens is undesirable for nearly everyone. Unless there are new rules or changes in the existing ones, nearly everyone will suffer... There is chaos when price cutting is extreme, most firms in the industry are losing money, and yet it is plain that buyers want the product and are willing to pay higher prices than those currently prevailing. The

state of the domestic passenger airline industry since 1980 may illustrate such chaos (Telser, 1987, p. 7).

The empty core confronting the airline industry is its inability to obtain equilibrium between price and costs in the long term. The industry has 80% fixed costs, high sensitivity to the business cycle, a discretionary and perishable product, and an inability to contract quickly enough to decrease costs in response to a crisis. Unlimited competitive entry exacerbates the empty core because New Entrants add surplus product even in the face of declining demand, such as a recession, and existing airlines (Incumbent⁸) feel forced to protect markets and respond with matching product and fare cuts. Excess supply leads to further price cuts, which in turn leads to prices below average total costs. With excess supply, no airline is able to raise prices above average total costs. Another element in this situation is the ease with which New Entrants enter the industry while significant barriers exist to exiting it, adding to surplus product problems (US Senate Hearing, *Statement of Andrew B. Steinberg*, 2007). Telser contends that the empty core can only be solved by reregulation of the airline industry. Thus, one of the issues before the reader is whether the industry continues with deregulation or should be reregulated.

Crisis and Innovation

Innovation is often cited as the solution to many problems within markets, industries, and societies, particularly when those problems are considered intractable. One of Deregulation's goals is to allow innovation to take place once "the meddling, protective and obstructionist hand of government" (Kahn, 1978, p. 35) is removed. How does innovation, particularly radical innovation come about?

Is there a relationship between crisis and innovation? Using the work of Raider (1998) this research seeks to confirm or refute such a relationship. If crises are an incubator for innovations, then the airline industry post-Deregulation is rife with crises and a fertile area of study. Two radical innovations, the computer reservation system (CRS) and the hub and spoke route system (Hub and Spoke), are investigated to confirm or refute the crisis - innovation relationship.

One type of innovation, radical innovation, changes the industry in a frame breaking way: it creates new or emergent customers, changes the technological trajectory of the industry (Abernathy & Clark, 1985; Benner & Tushman, 2002), creates follow-on innovations with a future flow of technologies, products, and services (Rosenkopf & Nerkar, 2001; Trajtenberg, 1990), and provides above industry rents (Harhoff, Narin, Scherer, & Vopel, 1999). If a radical innovation is also a key resource (Penrose, 1959; Wernerfelt, 1984), it is rare, valuable, difficult to imitate, and has few substitutes (Barney, 1991). Radical innovations as key resources provide innovators with sustainable competitive advantages. This research explores whether radical innovations, used as key resources, can solve the perennial crisis of the airline industry.

A corollary policy question raised by this investigation is who should benefit from radical innovations? In free markets the innovator benefits. However, because the airline industry is an imperfect oligopoly, innovation benefits do not flow to the innovator but, by regulatory acts of confiscation, to the industry and public, thus leading to the conundrum of advocating free market principles while limiting innovators' profits.

Institutional Complexity and Change

If radical innovations can indeed solve industry crises, are there any impediments to the adoption of radical innovations for the good of the innovator, industry, and public? To address this line of thinking, the institutional factors that inhibit change must be addressed. The two case studies trace the radical innovation through the innovation – regulation cycle, guided by the George, Chattopadhyay, et al. (2006) framework (GCSB Framework). The GCSB Framework focuses on "...how key decision makers' interpretations of environmental pressures are translated into organization actions that can potentially change institutions or help maintain them" (George et al., 2006, p. 347). Decision makers view environmental shifts and/or crises as either opportunities for, or threats to, legitimacy⁹, and ultimately, resources, and respond either isomorphically¹⁰ (giving a typical industry response) or nonisomorphically (giving an atypical industry response). Kahneman and Tversky's (1979) prospect theory posits that the potential to lose a resource makes decision makers more likely to select risky behaviors (i.e., nonisomorphic or atypical responses) to prevent that loss. Conversely, a decision maker is less willing to risk his/her resources and will seek less risky responses (i.e., isomorphic or typical responses) for opportunities to gain resources. George, Chattopadhyay, et al. (2006) incorporate prospect theory into their GCSB Framework.

While decision makers' responses to crises may not appear to be a major impediment to institutional change, in times of severe crises, industry players and

stakeholders find comfort in following perceived industry leaders and respond in lock step, either through enacting mimetic innovation¹⁰ or following the bandwagon effect (Aldrich & Fiol, 1994). Typical industry responses do not produce change in an industry. However, other players, who are often led by industry outsiders, may respond to crises in atypical ways. It is the atypical crisis response that creates a diversity of solutions, including radical innovations, and ultimately may provide a solution to and way out of a crisis. A third response to crises may be to request government intervention or regulation that may severely limit the diversity of crises responses and, thus, not lead to solutions to industry problems. The idea that atypical crises responses and experimentation trumps typical industry crises responses is at the heart of the discussion on institutions and change. This does assume, however, that the crisis is not so overwhelming that the industry is unable to respond, as was the case with the 9/11 terrorist attacks or the liquidity crisis of 2008.

The Way Forward

If the empty core theory best describes the industry, then there is little time to preserve the US airline industry as we know it today and the industry must be reregulated. If free markets represent the industry's future, removal of regulatory constraints must occur quickly to allow its survival. Whatever form the airline industry takes, critical policy issues on national security, economic prosperity, safety, service to all parts of the country, the environment, energy, airport and airspace infrastructure, and antitrust concerns must be addressed. The industry

is too important to allow it to fail due to application of the wrong theory, ignorance, or apathy.

Methods, Resources, and Results

This research uses both quantitative and qualitative data to analyze the impact of the Airline Deregulation Act of 1978 (Deregulation) on radical innovation in the industry — in particular Computer Reservation Systems (CRS) and Hub and Spoke strategies — and the subsequent regulatory and other institutional responses to these changes. Although quantitative data and analysis are used where available and appropriate, qualitative and historical methods are indispensable to capture the richness and complexity of a dynamic industry composed of many stakeholders during a period marked by explosive change and frequent crises. In the conduct of this research, only well documented, publicly accessible resources have been employed, and extensive referencing is provided throughout the study for use by researchers, policy makers, regulators, and the public in further inquiry. The following resources are among the most significant sources of information in this study:

1. *Aviation Week & Space Technology*, a weekly aviation trade journal published by McGraw Hill. Similar longitudinal research using trade journals was completed by Ahuja and Lampert (2001), Pettus (2001), and Rothaermel (2001).
2. Annual reports and 10K's produced by the major airlines studied. Annual reports have been used to identify changes to corporate strategies

and to assess causal reasoning within companies (Barr, Stimpert, & Huff, 1992; Bettman & Weitz, 1983; Bowman, 1978; Miller & Friesen, 1980).

3. Return on assets, dividend yields, share price to earnings ratios, and other financial data produced by Value Line and Standard & Poor's. However, it was soon evident that typical financial data was unhelpful in analyzing airline companies and the industry and Economic Value Added (EVA) data was substituted.

4. Standard & Poor's *Industry Surveys* which provided consistent long term data for the airline industry as well as on individual airline companies. This source was used by Rothaermel (2001) in his study of the pharmaceutical industry and radical innovations.

5. Public government records. These include: US House and Senate actions, hearings, and laws; court rulings and decrees (i.e., federal and bankruptcy); agencies' actions on the part of CAB, Department of Justice (DOJ), Department of Transportation (DOT), Federal Aviation Administration (FAA), General Accounting Office, later named Government Accountability Office (GAO); and special task forces to study aviation issues. This data set was originally not included. However, it is a serious mistake to exclude this data because of the government's fundamental role in overseeing the airline industry. It is often the response to regulations and laws that cause airline companies to seek radical innovations or to respond to the unintended consequences of government actions. This was particularly true in the Hub and Spoke case, and led to a

considerable expansion of that case study to include the many aspects of government regulation: airports, airspace, and antitrust.

6. Scholarly journals, books, newspapers, and magazines.

The results of this study are presented in four sections. *Section 1* provides an introduction to the airline industry in Chapter 1. The literature that is used to investigate this topic is reviewed in Chapter 2, covering the fields of strategy, economics, and institutional theory, and ideas on crisis and innovation. A quantitative analysis of the industry's economic condition is provided in Chapter 3 with profit and loss (P&L), debt to capital ratios, and Economic Value Added (EVA) data from the mid-1970s to the mid-2000s. Chapter 3 also reviews the industry's economic structure and results under Deregulation.

Section 2, made up of two chapters, covers the computer reservation system (CRS), later called the global distribution system (GDS). Chapter 4 is a historical case review of the CRS from its inception in the 1950s to its evolution as a radical innovation by United Air Lines (United) and American Airlines (American) in the mid-1970s leading eventually to, with the advent of the Internet, the use of the website by Southwest as an information hub for the travel industry in the mid-1990s and the subsequent reduction of the importance of the CRS.

Chapter 5 provides a discussion of the CRS, the innovation – regulation cycle, and the importance of crises that propelled the CRS to a radical innovation, with its use as a key resource, resulting in above industry rents and follow-on innovations. The CRS, controlled by United and American, was eventually limited by the government's efforts to limit innovators' profits at

competitors' urgings, but it was only the rise of another radical innovation, the website, that limited the CRS' duopoly control over the industry. Chapter 5 evaluates the CRS within the GCSB Framework and the institutional forces that inhibit or propel industry players to innovate, adopt, or mimic industry responses to crises. In particular, the roles of industry outsiders, population outliers, first-movers, and industry rivalries (Marvin B Lieberman & Asaba, 2006; M. B. Lieberman & Montgomery, 1988) are reviewed as radical innovations take hold in an industry and diffuse. Finally, Chapter 5 incorporates an analysis of the free market versus empty core applications as industry players search for solutions to industry crises.

An unexpected finding in the CRS case study was that innovators' profits are confiscated by antitrust actions and the resulting apparent conundrum in the free market view as to who should benefit from a radical innovation: the innovator, the industry, or the public. This finding is further investigated in Section 3 as well as the policy implications of radical innovations solving industry crises.

Section 3, made up of 5 chapters, covers the Hub and Spoke, used by some airlines to move passengers around a geographic area. While it was not the original intention to review so many aspects of the Hub and Spoke, it quickly became apparent that the Hub and Spoke as a radical innovation is based on complex, counterintuitive, and tacit knowledge that needed to be explored and documented. Glasser and Strauss' grounded theory methods for conducting qualitative research are used in this case. In their theory, "Grounded theory from data means that most hypotheses and concepts not only come from the data, but

are systematically worked out in relation to the data during the course of the research” (Glaser & Strauss, 1967, p. 6). This methodology encourages the researcher to follow qualitatively rich sources of data as they emerge during the study. One of the most important findings in this Section is the role of government (local, municipal, state, and federal) in controlling airports as well as stakeholders’ vested interests in maintaining existing institutions such as municipal bond markets. The sources of this research are government reports and Congressional hearings, neither of which was included in the original proposed source documents. Due to the diversity of data, the historical Hub and Spoke case study covers four chapters.

Chapter 6 discusses the change of the Hub and Spoke from an operations solution created by Delta Air Lines (Delta) in the 1950s to a radical innovation by United in the late 1970s. Chapter 7 discusses the efforts of New Entrants’ to enter airports including Southwest’s use of satellite airports. Chapter 8 discusses some of the regulatory responses to the Hub and Spoke’s above industry rents, barriers to entry, and follow-on innovations. Chapter 8 also outlines how airports are embedded within a complex web of institutions and stakeholders, often with conflicting goals. Chapter 9 discusses antitrust activities against Incumbents’ Hub and Spokes.

Chapter 10 discusses the implications of the Hub and Spoke as part of the innovation – regulation cycle, including crises that highlight the importance of airports as a key resource. The GCSB Framework allows the reader to follow industry players’ responses to crises and to understand the role of institutions in

encouraging or inhibiting change. Finally, Chapter 10 provides an analysis of the free market versus empty core applications. An important finding is that the supply and demand for airports has always been out of balance. Without an adequate supply of airports, the Hub and Spoke remains a key resource at certain airports, particularly slot-controlled airports.¹¹

Section 4 consists of Chapter 11, the final chapter of the dissertation, which summarizes the study findings and conclusions. It includes a discussion of the social good of maintaining a healthy and viable US airline industry, confirmation of Raider's (1998) research that crises provoke innovation, a review of support for the empty core theory versus the free market view, and a discussion of the policy considerations these findings evoke. Can the US airline industry be preserved as we know it today or must it be subsidized and reregulated as the empty core theory would predict, or does the industry's future depend on further removal of regulatory constraints as free market theory might imply? In discussing these difficult issues, this concluding chapter makes it clear that the stakes are high and policy choices are multifaceted, entailing complex interlocking institutional relationships, opposing economic philosophies, and wide ranging and sometimes competing national interests. Though time seems short, the study holds out hope that redoubled efforts to rationalize the regulatory environment combined with radical policy innovation remains possible for an industry in perennial distress.

Endnotes

1. Major airlines are defined by the US Department of Transportation (DOT) as earning revenues greater than \$1 billion/year. As of January 1, 1981, those airlines were American, Braniff, Continental, Delta, Eastern, Northwest, Pan Am, Republic, TWA, United, US Airways, and Western Airlines. National carriers are those airlines earning revenues between \$100 million and \$1 billion and were Air California, Air Florida System, Alaska Airlines, Aloha Airlines, Capitol International Airways, Frontier, Hawaiian Airlines, Ozark Air Lines, Pacific Southwest Airlines, Piedmont Aviation, Southwest, Texas Air Corp. (as parent to Texas International), Transamerica, Wien, and World Airways. Regional airlines are those earning revenues less than \$100 million but more than \$25 million.

As of January 1, 2005 major airlines were: ATA Airlines, AirTran, Alaska Airlines, America West, American, Delta, Continental, JetBlue, Northwest, Southwest, United, and US Airways. In 2006 America West and US Airways merged and are now called US Airways and in 2008 Delta and Northwest merged and are now called Delta.

2. The liquidity crisis of 2008 led to an estimated \$5.1 trillion commitment by the federal government to Fannie Mae, Freddie Mac, Bear Stearns, American International Group, expansion of the Federal Deposit Insurance Corporation to guarantee deposits to \$1.5 trillion, buyer of last resort of short-term commercial paper used by many businesses to finance daily operations, and the investment of \$250 trillion into the largest banks, but does not include the \$620 billion in currency swaps with central banks in other countries (Lohr, 2008).

3. Trunk carriers were later named major airlines (Majors) by DOT.
4. New Entrants are those airlines that were either new airlines post-Deregulation or were intrastate, regional, air taxis, commuter or other airline pre-Deregulation but not subject to CAB oversight.
5. Industries that require regulation are those in which competition is not expected to be feasible, sometimes called natural monopolies. An industry is a natural monopoly when the minimum average cost of production occurs at a rate of output generally sufficient to supply the entire market. If two firms split the market, each would be smaller than its optimally efficient size and each would have relatively high costs and an incentive to expand output. If both lower prices to sell more, price will generally fall faster than average cost because a large portion of production costs in these industries is fixed, and competition becomes ruinous. Ultimately, only one firm can survive in such a market. Virtually all public utilities are natural monopolies (US GAO, 1990a).
6. Currently, 51% ownership by US nationals is required for all US airlines, of which 25% may be owned by only one foreign entity. This is under Congressional review to change to 25% ownership by US nationals.
7. Open Skies agreements are between foreign governments that allow foreign airlines to gain flying rights to additional cities instead of just to designated gateway cities, such as New York, San Francisco, and Chicago. The US and European Union (EU) signed Open Skies agreements in 2007, effective in 2008, that allow US airlines to fly between more EU cities. Conversely, EU airlines can fly to more US cities.

8. Incumbents are those airlines that existed pre-Deregulation and were subject to CAB oversight.

9. Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions (Suchman, 1995, p. 574).

10. An isomorphic response is consistent with the responses of other legitimate actors in the industry. Conversely, a nonisomorphic response departs from what is considered legitimate in the industry (George et al., 2006, p. 348)

There are three types of isomorphic responses: mimetic, coercive, and normative. Mimetic responses, the most common, include modeling after industry leaders or following their lead in times of crises. Coercive responses include using political influence and raising questions of legitimacy. Normative responses are usually professionalization of an industry or institution, often by consultants (DiMaggio & Powell, 1983, p. 150).

11. The original five slot-controlled airports were Chicago's O'Hare International Airport (O'Hare Airport), Washington, DC's National Airport (National Airport), and NY/NJ's La Guardia Airport, JFK Airport, and Newark Airport. Newark Airport was removed from slot-control status in 1970, but reinstated in 2008.

CHAPTER 2

CRISES, INNOVATION, AND REGULATORY RESPONSE

Because of the rich complexity of the topic, this research employs historical case study methods, using both publicly available quantitative and qualitative data, and generally follows Glaser and Strauss' (1967) grounded theory methods for conducting qualitative research. "Grounded theory from data means that most hypotheses and concepts not only come from the data, but are systematically worked out in relation to the data during the course of the research" (Glaser & Strauss, 1967, p. 6). This methodology encourages the researcher to follow qualitatively rich sources of data as they emerge during the study. For instance, after uncovering extensive sources of government data pertaining to these cases, significant insights were gained into the complexity of the institutional relationships affecting both strategic and regulatory decisions within the industry.

It is not altogether possible, as Glaser and Strauss idealize, to engage a complex, widely studied industry such as this without preconceived ideas about how things work or assumptions derived from dominant disciplinary paradigms that privilege our points of view. At best, a researcher can try to be alert to her own predispositions and put them to the test against the data as it emerges. In my case, the disciplines that have affected my initial framing of this research derive from strategic management, economics, and organizational behavior. More particularly, the strategic management literature on crisis, innovation (Raider, 1998), and key resources (Penrose, 1959; Wernerfelt, 1984) was

instrumental in my initial framing of the study. I was influenced by economic views on free markets (Winston, 1999); the empty core theory (Telser, 1978); notions of sunk costs and irreversible resource commitments to specific strategies (Ghemawat, 1991); and an understanding of lumpy resources (Pettus, 2001). Lastly, it is my premise that fear of change can cause disequilibrium in markets and threaten existing structures, markets, and positions of power (Henderson, 1993; Reinganum, 1983). My understanding of institutional persistence and complexity derives from the organizational behavior literature, in particular new institutionalism (DiMaggio & Powell, 1983), the threat-rigidity hypothesis (Staw, Sandelands, & Dutton, 1981), prospect theory (Kahneman & Tversky, 1979), and George, Chattopadhyay, et al.'s (2006) Framework in which to understand institutional change.

Crises and Strategic Innovation

The research literature defines crisis in a number of ways. Lipman-Blumen defines a crisis as "any situation recognized by participants of the system as a threat to the well being, sustenance or survival of the system, or any of its sub-segments, whose traditional problem solving mechanisms and resources are strained or inadequate to resolve efficiently the problem confronting it" (Lipman-Blumen, 1973, p. 105). For Fink, it is an "...unstable time or state of affairs in which a decisive change is impending – either one with the distinct possibility of a highly undesirable outcome or one with the distinct possibility of a highly *desirable* or extremely *positive* outcome (italics in the original)" (Fink, 1986, p. 15). The common elements of these definitions are change and a challenge, or

threat to the organization, institution, or member(s). The former definition will be used in this dissertation with the addition of the latter's outcome being either highly undesirable or highly desirable.

Crises come in different forms, magnitudes, and intensities. They can affect a whole industry (e.g., deregulation), a specific company (e.g., bankruptcy), certain parts of an organization (e.g., reservations), or specific stakeholders (e.g., creditors). Some situations can be mislabeled as crises, such as emergencies (e.g., long delayed flights), normal market competition (e.g., price wars), or strained day-to-day operations (e.g., bad weather). Some crises are clearly defined (e.g., fuel prices), and others are ambiguous (e.g., the public's fear of flying after the 9/11 terrorist attacks). They can come in rapid succession, overwhelming an organization's ability to respond, or can be one single, devastating event. Lipman-Blumen (1973) documents the build up of some crises to a threshold as well as cascading crises, where the crises are so extreme that change must take place and can't be ignored. This research will attempt to understand some events that lead to crises that in turn prompted innovative responses.

Typically, a crisis requires the organization, its parts, or the industry as a whole to marshal slack resources (or if none is available, to reallocate scarce resources) to respond to it. Resources may include capital, credit lines, leadership, knowledge, skills, technology, patents, airport slots and leases, legitimacy, or government relations. According to March and Simon (1958), these resources must be sufficient to enable the organization to transform them into

adequate inducements to insure future resource flows from key stakeholders. Successful crisis response with the appropriate innovation grows the organization's resources, building new skills and knowledge and adding more inducements to key stakeholders for necessary future resource flows.

Raider (1998) found that innovation among companies is greatest when the competitive environment is most severe. That is to say, companies that face strong, oligopolistic buyers and suppliers have higher rates of innovation and research and development (R&D) investment. Further, constrained industries use R&D to break out of their positions to increase market share, open new markets, improve quality, or increase profit margins. Raider (1998) also found that membership in large networks constrains innovation. Raider's (1998) relationship between crises and innovation, particularly radical innovation, will be examined in this thesis.

The Innovation – Regulation Cycle

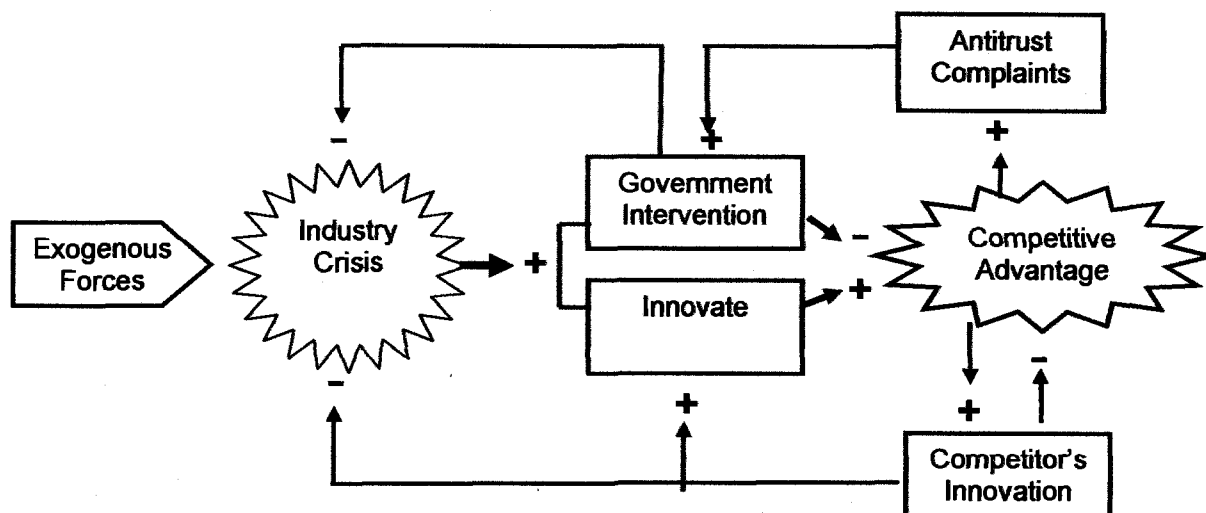
The adage "Necessity is the mother of invention" is at the core of the decision by proponents of the Airline Deregulation Act of 1978. This wisdom led them to reason that Deregulation would bring more innovation to the industry for the benefit of both the industry and consumers. Marketplace competition would create incentives for companies to innovate and enable them to benefit from market opportunities open to them if regulatory protections were removed, particularly with regard to price, schedule, and market entry and exit. The basic proposition, which agrees with Raider's research (1998), is that crisis provokes innovation.

It is useful to distinguish between company innovation and the process by which any given innovation diffuses through the industry. At the outset, a company may innovate to avoid or survive a crisis or to improve its competitive position. This innovation leads to a competitive advantage, one that erodes as the innovation spreads throughout the industry. Initially, the company expects to prosper by its own initiative. However, eventually the performance of the entire industry is affected, often to the benefit of consumers. This brings about a difficult question of public policy: To what degree is it in the public interest to regulate the extent and duration over which the initiating company's innovations can remain proprietary? Logically, the innovating company pressures the government to protect its right to extract its benefit, for example, above industry rents, at least long enough for the company to recover a reasonable return on their investment. Similarly, competing companies lobby regulators to limit the innovator's market power, arguing for protections from unfair business practices.

The "innovation-regulation cycle" is shown in Figure 1 and can be summarized as:

1. Exogenously or endogenously induced crisis leads either to significant innovation or pleas for regulatory intervention.
2. Radical innovation leads to competitive advantage for the originator.
3. Competitive advantage for the originator leads to competitive crisis for other players.

Figure 1
The Innovation – Regulation Cycle



4. Competitive crisis may lead other players either to:
- Initiate innovative response (often mimetic), or
 - Respond with another radical innovation, or
 - Support regulatory intervention (often coercive).

Competitive companies have three choices in this cycle. The choice of 4a, initiation of their own mimetic innovation, constitutes the first instance of the original radical innovation spreading through the industry, as, for example, the Computer Reservation System (CRS). This choice places competitive pressures on other industry players to either play catch up with innovation originators in what Aldrich and Fiol (1994) call the bandwagon effect, often with a significant expenditure of resources required, or to coexist with the innovation originators by forming alliances. The second choice, 4b, additional radical innovation, constitutes a new transformational radical innovation, as, for example, in the case of migrating CRS functions to the Internet. The final choice, 4c, lobbying for

regulation, builds up new regulatory pressures on first movers, limiting their abilities to extract above industry rents and their market power. This choice also creates crises for innovation originators because a regulatory spotlight may hinder other strategic moves unrelated to the original innovation. For example, as will be examined in detail in Section 2, American was subject to just such regulatory oversight as long as it maintained a strong CRS market position. The process can be seen as iterative, that is step 4 spirals back to step 1.

Strategic Responses to Crisis

Strategic responses to crises may take a variety of forms, such as:

1. *Radical innovations.* Benner and Tushman (2002) and Abernathy and Clark (1985) defined a radical innovation as an innovation that fundamentally changed the technological trajectory of a given industry and is designed for new or emergent customers. Haroff, Narin et al. (1999) defined radical innovations as providing a company with above industry rents.
2. *Follow-on innovations.* Radical innovations create follow-on innovations, which provide additional future technologies, products and services for the innovator (Rosenkopf & Nerkar, 2001; Trajtenberg, 1990). This would include, for example, the CRS and its many follow-on innovations such as frequent flier programs (FFP), travel agent commission overrides (TACOs) to steer passengers to a particular airline, and seat inventory control.
3. *Incremental innovations.* Incremental innovations are those innovations that alter the radical innovation's technological trajectory, but not in a frame breaking way. For example, the CRS moved reservations from a paper

and pencil system to a computer system, a radical innovation. Orbitz.com allowed airlines to bypass the CRS and its fees, but was not a radical change from computer-based reservation systems. An incremental innovation, one that changes the radical innovation, must be differentiated from a follow-on innovation, one that provides products and services derived from either the radical or incremental innovation.

4. *Mimetic response.* Mimetic behavior is a typical isomorphic¹ response to crises and uncertainty (DiMaggio & Powell, 1983) where a company models its behavior or response after a perceived industry leader. Examples of companies that exhibit a mimetic response are those that closely follow an industry leader, such as American following United's lead in CRS marketing. The Bandwagon effect (Aldrich & Fiol, 1994) is caused by a competitors' fear of their possible underperformance relative to the industry average if an innovation is not adopted. This leads to the innovation being adopted even if inappropriate or if it has a negative financial impact (Abrahamson & Rosenkopf, 1993). Thus, Northwest Airlines (Northwest), under pressure from stakeholders to join a more robust CRS through merger, purchase, or alliance, continually tried a number of CRSs, all unsuccessful and an eventual waste of money and resources. In comparison, Southwest avoided the whole CRS strategy and the negative bandwagon effects.

5. *Coercive response.* A coercive response is an isomorphic response to crises where players seek political influence and/or legitimacy² to solve the crises (DiMaggio & Powell, 1983). A typical coercive response in the airline

industry is for one company or several companies to request government intervention (e.g., new laws, rules, lawsuits) to control the environment or to diffuse the radical innovation throughout the industry (i.e., limit above industry rents of the innovator).

These strategic responses depend upon the innovator's resources; standing or legitimacy within the industry, a leader is more likely to persevere in its strategy than a weak competitor; management's view of the risks; and whether the innovator and competitors are likely to use strategies that are more common to the industry, isomorphic, or uncommon, nonisomorphic.

Strategic Resource Dependence and Other Economic Perspectives

Wernerfelt's (1984) seminal article on strategic resource dependence demonstrated how key resources can be used to create sustainable competitive advantages and provided a bridge between the economics field (Penrose, 1959) and the strategy field. The analysis is included here because the researcher proposes the following:

1. if a crisis provokes an innovation, and in specific a radical innovation, and
2. that radical innovation is treated as a key resource, then
3. an innovator is able to reap above industry rents and build significant market barriers to prevent competitor entry.

The resource-based view of the company analyzes a company's resource position and determines strategic options that provide sustainable competitive advantage (Penrose, 1959; Wernerfelt, 1984). To optimally manage resources, a

company must strike a balance between the exploitation of existing resources and the development of new ones (Penrose, 1959; Wernerfelt, 1984). Strategic resources, sometimes called key resources, are by definition rare, valuable, have few substitutes, and are difficult to imitate (Barney, 1991). Examples of such resources are brand names, knowledge, technology, patents, and airport leases and landing slots.

Using key resources, a company can build barriers that prevent competitors from accessing those key resources, allowing it to gain long-term advantages and above industry rents. Building upon its first mover advantages, a firm can thwart competitors' entry into the niche it has created with key resources, and can often retain control of these resources via economies to scale, customer loyalty, execution of experience curve strategy, and technological leads. However, if companies do not control their key resources, the advantages can dissipate and diffuse into the industry. Companies can try to acquire key resources in their mergers and acquisitions or alliance strategies. In this dissertation, the CRS and the components that support the Hub and Spoke route network are key resources.

In addition to the resource-based view of the firm, other economic perspectives are included in this thesis to analyze crises and innovation. As extensively researched, airlines fear cannibalizing their existing revenue streams, products, and services by introducing radical innovations (Gilbert, Newberry, & Reinganum, 1984; Reinganum, 1983). Further, fear of the change that will be introduced by radical innovations can cause a disequilibrium in the market and

threaten existing structures, markets, and positions of power (Henderson, 1993; Reinganum, 1983). A few common ideas of economics and strategy are sunk costs and irreversible resource commitments to specific strategies (Ghemawat, 1991) and lumpy resources (Pettus, 2001). Lumpy resources are resources that are not continuously consumed but that represent large expenditures used periodically, such as airport improvements, technology, and airplanes. Resources that are deployed one way in one environment (i.e. pre-Deregulation) may be hard to reorient in a different environment (i.e., post-Deregulation). Moreover, resource conversion requires some admission of management "error," explanation as to the change in strategy, book write-offs, losses, and stockholders and lenders' concerns. These economic concepts, including the free market view and empty core theory, will be examined more fully in later chapters when analyzing the strategic responses to crises by various individual airline companies.

Free Market View versus Empty Core Theory

As will be shown in Chapter 3, the airline industry is in dire financial condition with several of its Majors, both Incumbents and New Entrants, in bankruptcy, exited from bankruptcy, or hovering on the edge of bankruptcy for most of the current century. With a recession in 2008, historically high fuel prices, and a liquidity crisis caused by the subprime housing market, prospects for the industry continue to remain dire. So where does the future lie for the US airline industry? Two competing ideas about the industry's future lead to different policy recommendations. One view holds that the industry was not completely

deregulated in 1978, but must be if it is to fully enjoy the benefits of a free market economy (Winston, 1998). The other view holds that the industry has an economic empty core (Telser, 1978), that is, that the nature of the industry is such that there is no equilibrium between the price of goods sold and the cost of goods produced at which any providers can survive over the long run. Framed differently, the question revolves around the need for and the role of regulation, if any, versus the ability of the airline industry to innovate itself out of its financial crises. This is the heart of the question this dissertation hopes to illuminate by examining the history of two strategic radical innovations and the corresponding regulatory responses: the CRS in Section 2 and the Hub and Spoke strategy in Section 3.

Believing that hybrid regulation is not ideal (i.e., it took the worst of regulation and free markets and created distortions), free market proponents urge patience and freer markets as the path toward industry health. According to Winston (1998, 1999) and others (see Morrison and Winston (1986, 1989, 1995; 1997)) sunk costs resulting from regulation cause problems for the transition to deregulation, and thus time will be needed to dismantle regulatory regimes. Winston (1999, p. 40) argues that regulation continued in the form of deeply rooted institutional effects: "...a deregulated industry is not safe from regulation's pernicious effects.... [the FAA prohibits] long-distance flights to or from ... Reagan National and ... La Guardia airports. Slot controls limit the number of takeoffs and landings..." Further, Winston (1999) argues that policymakers should extend deregulation to international markets, including routes and price

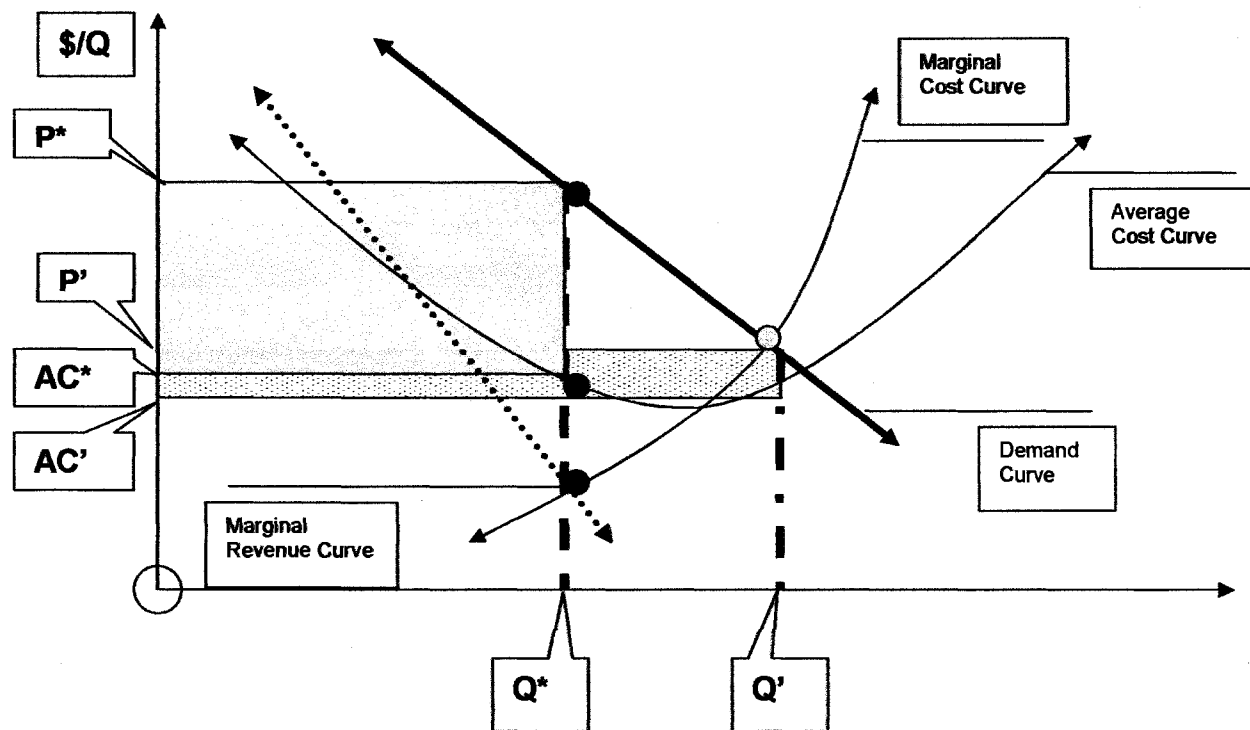
controls, and open domestic markets to foreign competition through Open Skies agreements. Winston and other free market proponents recommend privatizing airports and air traffic control, removing airport expansion controls due to funding, noise controls, and airport leases, and relaxing controls of foreign ownership of US airlines.

By contrast, empty core proponents argue that conditions for long term survival without regulation do not exist, because of the industry's empty core. Therefore, some explanation of the empty core idea may, at this point, be helpful. According to the theory, an empty core occurs when the following conditions exist:


1. U-shaped or flat-bottom average cost curves and increasing marginal cost curves (Viner, 1931);
2. supply curves are not infinitely elastic;
3. periods of low demand in which the industry is unable to contract;
4. small number of participants; and
5. unlimited competition.


Figure 2 shows a non-empty core with normal or high demand. An example of this was the period from 1995 to 1998 (see Chapter 3) when the economic expansion period caused a strong demand for airline seats by consumers and businesses. There also were no fears of wars, terrorism, or pandemics. Figure 2 has a U-shaped average cost (AC) curve, or as Telser later

Figure 2
Non-Empty Core with Normal or High Demand and U-Shaped Average Cost Curve



Key

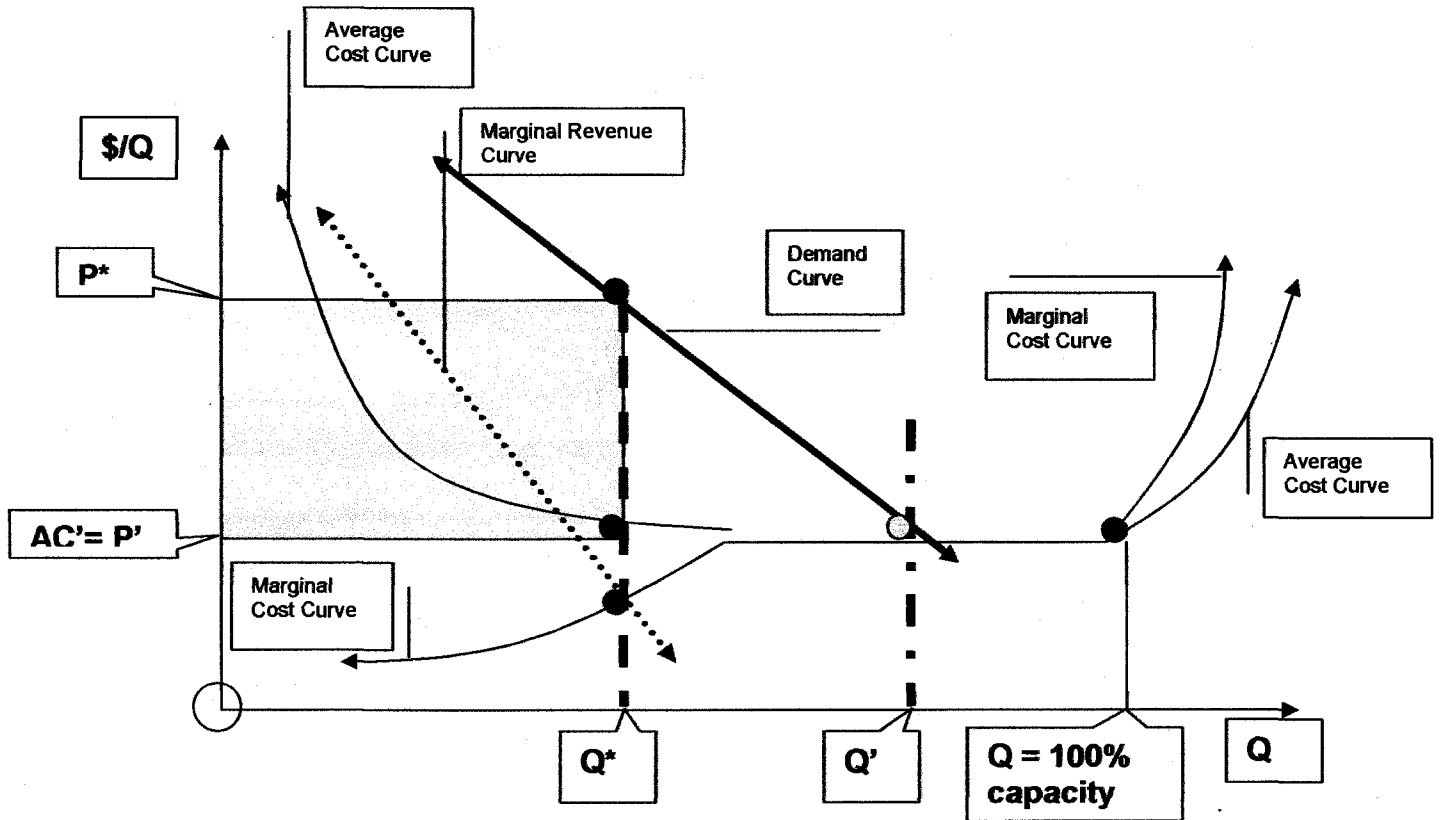
Total $P^* > \$0$ 

Total $P' > \$0$ 

$TP^* > TP''$

named it, a flat-bottom AC curve, as in Figure 3. This means that the AC produced by a firm declines and remains relatively flat before AC increases as the firm increases production. Marginal cost (MC) is the incremental cost to produce one additional unit (i.e., to fly the one additional passenger or plane) and increases faster than AC, when ACs are rising, as a firm increases production. The demand (D) curve is normal or high, meaning the economy is expanding and

Figure 3
Non-Empty Core with Normal or High Demand and Flat-Bottom Average Cost Curve

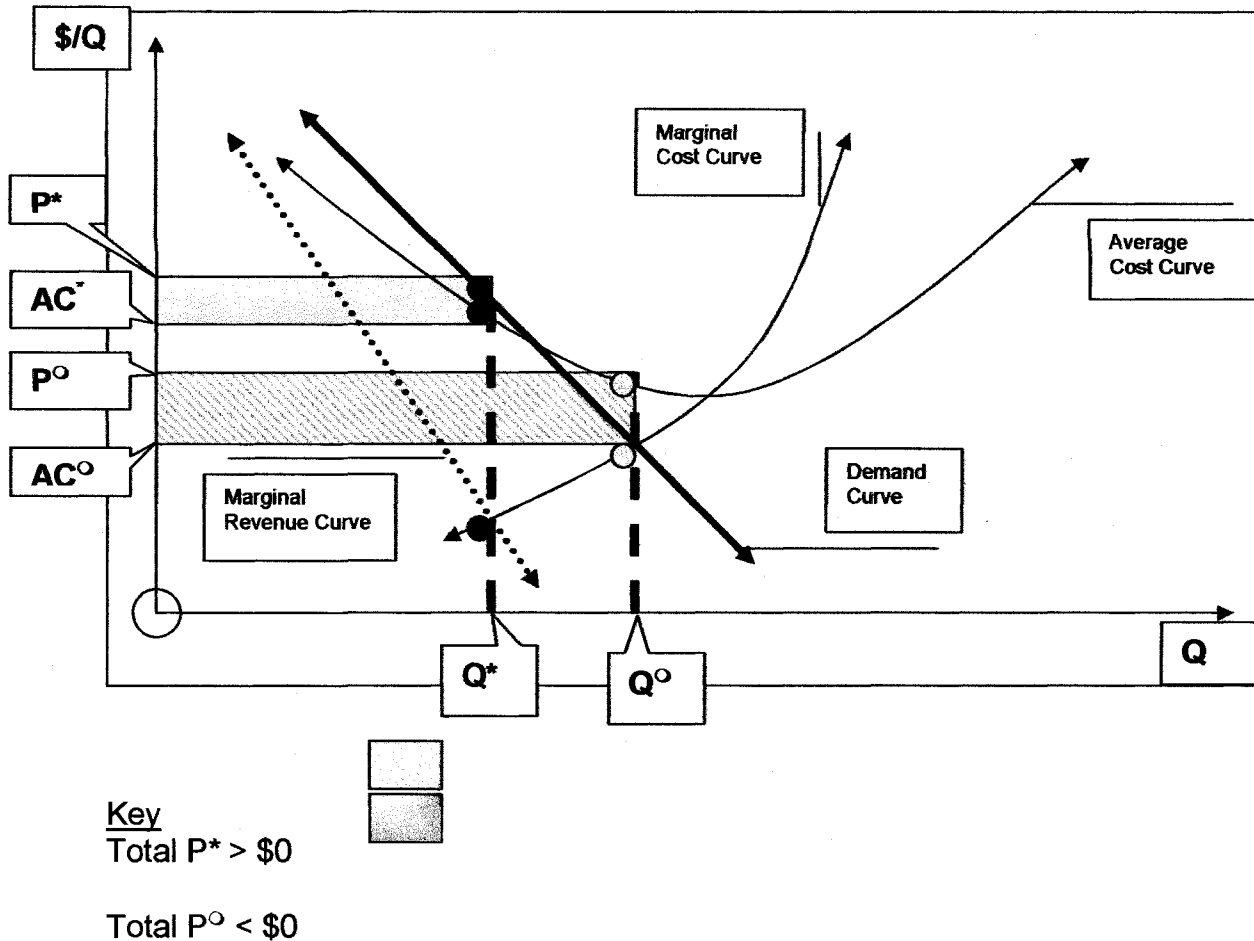


Key

Total $P^* > \$0$

no crises of war or terrorism exist. The marginal revenue (MR) curve is the last dollar earned by the firm for the last product sold. Q^* is the optimum amount a firm produces where the MR curve intersects the MC curve. A vertical line from Q^* to AC and D is the optimal average cost (AC^*) for a firm and the optimal price (P^*) a firm should charge. The shaded area formed by the points AC^* , P^* , and the y-axis is the area where the firm earns more than \$0 for its total production at P^* . Firms have positive profits at this demand. Lower on the demand curve, at

Figure 4
Empty Core with Low Demand and U-Shaped Average Cost Curve



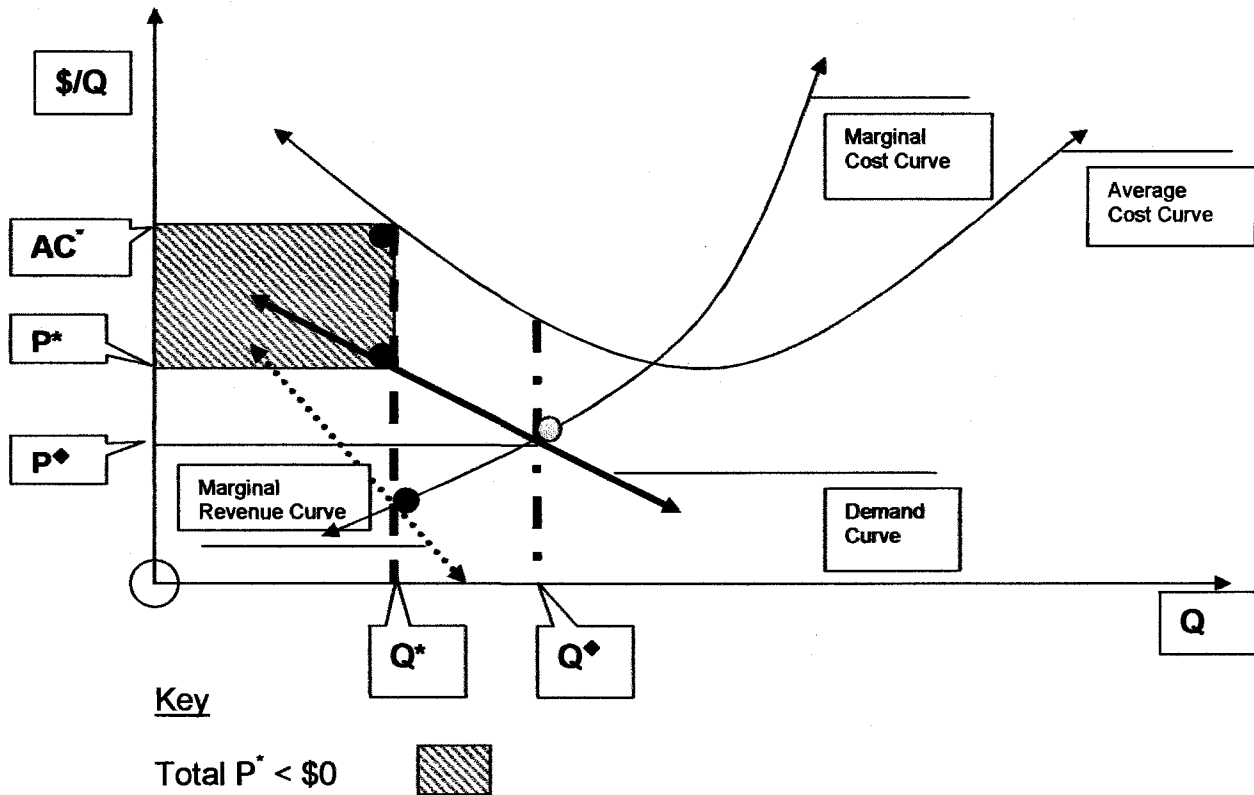
output Q' , MC is greater than AC. Price, P' , is lower than optimal price, P^* . Firms earn enough to cover costs but make zero profits. Total P' equals zero.

By contrast, Figure 4 shows an empty core with low demand and a U-shaped AC curve, as happens when recessions, wars, and other crises strike the industry. This was seen in the economic recession of 2001 (see Chapter 3), exacerbated by the 9/11 attacks, fears of terrorism, Gulf War II, and high fuel costs. Demand falls and because demand is so low, the industry as a whole is unable to make a profit to cover its costs. The industry with high fixed costs is

unable to contract sufficiently to respond to sharply reduced demand. Q^* , or the optimum amount a firm produces is where the MR curve intersects the MC curve. A vertical line from Q^* to AC and D indicates the optimum price, P^* , a firm obtains. The shaded area formed by the points AC^* , P^* , and the y-axis is the area where the firm earns more than \$0 for its total production at P^* . At lower demand, Q° , where the MC curve intersects the D curve, produces price P° . At P° , the firm receives a price that is lower than its AC° , and the firm earns negative profits (loses money), or TP° is less than \$0. As will be shown in Chapter 3 the airline industry experiences low demand with regularity due to the cyclical nature of the industry and its sensitivity to recessions, interest rates, and crises. The industry produces a perishable, seasonal, and discretionary good and has high fixed costs which exacerbates its financial condition.

Figure 5 shows an empty core with demand so low that average cost is never covered. MC and MR intersect to produce Q^* , P^* and AC^* , where TP^* is always less than zero. An example of this scenario is the Essential Air Service Program (EASP), a program to enable small cities to adjust to Deregulation and whose routes would otherwise be unprofitable without a subsidy. EASP was set to expire in 1988, but was subsequently renewed, and finally made permanent. Subsidies were \$110 million per year (Bailey, 2006c). Based on P&L volatility (see Chapter 3) the industry was unable to earn sufficient profits to cover losses. From the empty core perspective, the EASP will never break even, and the

Figure 5
Empty Core with Insufficient Demand, U-Shaped Average Cost Curve, and Subsidies (Essential Air Service Program)



government and institutional forces (i.e., Congressional and states' pressures to maintain subsidies) have acknowledged this by permanently subsidizing the program.

Table 1 compares the two competing ideas (i.e., free market versus empty core) along key criteria: main idea, consumer and social welfare, innovation, antitrust, and possible solutions. The main idea of the free market view is to improve efficiencies in the airline industry and benefit consumers with low prices.

Table 1
Summary of Free Market View versus Empty Core Theory

Key Criteria	Free Market	Empty Core
Main Idea	Improve efficiency and benefit consumers by competitive entry pressures	Bridge empty core so industry can survive by entry and/or price regulation
Consumer Welfare (lower prices)	Yes, though prices will vary based on economies of scale (small vs. large cities)	No, prices must be high enough to bridge empty core when demand falls
Social Welfare (safety/national defense)	Safety: Yes National defense: ?	Safety: Yes National defense: ?
Innovation	Benefits consumers	Benefits companies and industry to bridge empty core
Antitrust	Yes, to maintain consumer welfare and improve efficient entry	No, unlimited entry must be regulated; above industry rents needed to bridge empty core
Possible Solutions	More time; removal of regulatory sunk costs, regimes, and deeply rooted institutional effects; deregulate international markets; privatize airports and air traffic control; remove airport controls on funding, noise, and leases; and/or allow greater foreign ownership of US airlines	Limit competitive entry; price controls; cartels, cooperative agreements, and vertical integration, mergers, acquisitions, and bankruptcies that reduce excess capacity; alliances; and/or diversification ^a

Note: (a) "limit competitive entry and price controls" are from *Economic Theory and the Core*, by L. G. Telser, 1978, Chicago: University of Chicago Press; "cartels, cooperative agreements, and vertical integration" are from *A Theory of Efficient Cooperation and Competition*, by L. G. Telser, 1987, New York: Cambridge University Press; the rest of the possible solutions are those of the author. Data were from *Economic Theory and the Core*, by L. G. Telser, 1978, Chicago: University of Chicago Press; *A Theory of Efficient Cooperation and Competition*, by L. G. Telser, 1987, New York: Cambridge University Press; and "U.S. Industry Adjustment to Economic Deregulation," by C. Winston, *The Journal of Economic Perspectives*, 12, pp. 89-110.

In other words, free market forces will achieve industry equilibrium in prices and costs through the competitive pressures of New Entrants. Consumer welfare under free markets will be achieved by lower prices, higher quality, and more consumer choices. However, low prices will not be uniform in all markets, as small markets with fewer passengers do not have the same economies of scale as large markets with more passengers. Radical innovations will provide consumers with lower prices and advantages of increased efficiency. Antitrust enforcement is needed to maintain low prices for consumers and allow for entry of new competitors. If antitrust enforcement is not maintained, Incumbents can build significant barriers that allow Incumbents to maintain high prices and prevent competitive entry. Possible solutions to ensure that free markets prevail in the long run are to allow more time for Deregulation to work; remove regulatory sunk costs (e.g., slot controls at four airports), regulatory regimes (e.g., DOT, FAA), and deeply rooted institutional effects; deregulate international markets; privatize airports and air traffic control; remove airport controls on funding, noise, and airport leases; and/or allow greater foreign ownership of US airlines.

In contrast, the main idea of empty core theory is that the airline industry and other industries that exhibit a U-shaped AC curve cannot achieve equilibrium between price and cost when demand falls, and the industry cannot survive in the long run without government regulation. Consumer welfare of low prices cannot be met because prices must be high enough for airlines to produce profits to survive in the long run. Radical innovation should be used for the benefit of airlines so they can survive periods of economic recessions and crises that

create low passenger demand. Antitrust enforcement eliminates above industry rents and market barriers that airlines use to accumulate sufficient profits to withstand recessions and other shocks. Reducing competitive entry and eliminating low prices, the empty core theorists contend, are needed to bridge the empty core, which cannot be achieved with strict antitrust adherence. Other possible solutions that are explored in this thesis are mergers, acquisitions, and bankruptcies that reduce excess industry capacity; vertical integration; alliances; and/or diversification into other related lines of business.

Free market and empty core ideas are compared to Deregulation's goals in Table 2. Some of the standards provide contradictory guidance to policy makers and regulators when viewed through these two lenses.

1. The most significant difference between the competing ideas is in their overarching goals. The free market view places consumers' interest (i.e., low costs, quality service, consumer choice) as the overarching goal in which all outcomes are measured. In contrast, the empty core theory places the survival of the industry and airline services to the public as its overarching goal.
2. The standard, "safety as the highest priority," is common to both free market and empty core proponents. However, neither group has discussed the social welfare of national defense, which the airline industry provides. For example, in a national emergency, the government can ask airlines to provide the military with key services or during times of oil

Table 2
Deregulation's Goals Relative to Free Market and Empty Core Views

Standard	Free Market	Empty Core
(1) Overarching Goal	Consumer welfare (low cost, quality service, and choice)	Industry and airline service survival
(2) Safety	Yes	Yes
(3) Variety of economical, efficient, and low-price airlines	Yes	No
(4a) Maximum reliance on market forces and actual and potential competition (4b) Airlines earn adequate profits and attract capital	(4a) Yes (4b) Yes	(4a) No (4b) Yes
(5) Prevent unfair, deceptive, predatory, anticompetitive practices and monopoly conditions	Yes	No
(6) Service to small communities	No	Yes
(7a) Entry by new airlines (7b) Encourage existing airlines to enter new markets (7c) Strengthen small airlines	(7a) Yes (7b) Yes (7c) Yes	(7a) No (7b and c) Yes, if industry financially healthy
(8a) Unleash innovation to benefit consumers (8b) Unleash innovation to benefit the industry	(8a) Yes, primary goal (8b) Yes, but secondary goal	(8a) Yes, but secondary goal (8b) Yes, primary goal

Note: Data from *Standard & Poor's Industry Surveys*, by Standard & Poor's, 1979, New York: Standard & Poor's (Copyright by Standard & Poor's. Used by Permission); *Economic Theory and the Core*, by L. G. Telser, 1978, Chicago: University of Chicago Press; "US Industry Adjustment to Economic Deregulation," by C. Winston, 1998, *The Journal of Economic Perspectives*, 12, pp. 89-110; and "You Can't Get There From Here," by C. Winston, 1999, *Brookings Review*, 17, pp. 36-48.

shortages the government can ask airlines to provide service to areas that may not have sufficient airplane fuel.

3. This third standard seeks a diverse number of airlines that are economical, efficient, and low-priced. Free market proponents seek this outcome based on unlimited entry into the industry that will drive down costs and prices and produce economical airlines. Empty core proponents believe that unlimited entry exacerbates the empty core problem and that airlines must charge a reasonable rate to provide for their and the industry's long-term survival.

4a. The fourth standard places maximum emphasis on market forces, and is in line with free market thinking. Empty core theorists believe that the industry cannot survive in the long-term with unlimited competitive entry.

4b. The fourth standard also encourages airlines to earn adequate profits and attract capital. While free market proponents believe that a market solution will provide adequate profits and, therefore, access to capital, empty core proponents believe that unless the empty core is solved, airlines will not be able to earn sufficient profits in the long run and, therefore, will be closed to capital markets. If this standard cannot be met, what guidance is provided by the regulations? Is this standard eliminated or is this standard elevated to a higher status that eliminates or reduces the priorities of other standards?

5. This standard is the antitrust standard against predatory and anticompetitive practices, industry concentration, and monopoly conditions that increase prices, reduce services, or exclude competition. Free market proponents argue for antitrust enforcement to ensure markets operate efficiently and allow for competitive entry. Antitrust enforcement eliminates above industry rents and market barriers that airlines could use to accumulate sufficient profits to withstand recessions and other shocks, and thus bridge the empty core.

6. Free market proponents acknowledge that due to economies of scale, cost vary in different sized markets, with some markets too small for air service. Free market proponents would argue against subsidies to small communities and isolated areas. Empty core theorists contend that government subsidies are required when demand is so low that the average cost is never covered and air service is perceived as a public necessity (see Figure 5). EASP evolved from this standard to ensure small communities and isolated areas had air service on otherwise unprofitable routes.

This standard is contradictory because while the Civil Aviation Board (CAB) knowingly cross-subsidized lightly traveled, short routes with profits from heavily traveled long routes, one of the goals of Deregulation was to eliminate such subsidies. However, in order to win sufficient Congressional support, EASP was added to the Deregulation Act. As will be seen in the Hub and Spoke case, ensuring low cost fares is part of the

overarching goal of regulators, regardless of route length and the cost to provide such services. This standard contradicts the Deregulation Act which relies on competitive markets to provide convenient, low-cost air service. It will be shown in the Hub and Spoke case that the existence of this contradictory standard caused both regulators and regulated to respond in ways that created distortions to the free market view (e.g., slots to small cities at slot-controlled airports and perimeter controls at National Airport in Washington, D.C. (National Airport)).

7a. Free market proponents believe the benefits of free markets are achieved by unlimited entry while empty core proponents believe that unlimited entry causes the empty core to manifest.

7b. Free market proponents believe that existing airlines should be faced with the discipline of the market, and can benefit by entering new markets. Empty core theorists believe that unlimited competition, including that from existing and small airlines, is too destructive to the industry long-term. Part of the destructive market entry was 49 and 99 cent fares when airlines entered new markets (Aviation Week & Space Technology, 1979h) and continue to this day with go!'s \$1 fares in Hawaii (Segal, 2007).

Transcontinental fare wars between American, United, Eastern Air Lines (Eastern), Trans World Airlines (TWA), and World Airways were so destructive that breakeven was nearly impossible (Aviation Week & Space Technology, 1980d).

7c. Free market proponents would strengthen small airlines by making them subject to the discipline of the market place. Empty core theorist would seek the overall strengthening of airline industry, inclusive of both large and small airlines. However, if the industry is in danger of failing, empty core theorist would not seek unlimited entry into new markets by existing airlines and small airlines as a means of strengthening them.

8a. While Deregulation intended to unleash innovation to benefit consumers and the industry, how such innovation is used and for whose benefit is viewed differently by different stakeholders, including the government. In the case of the CRS for example (see Section 2), government, in congruence with free market proponents, wanted innovation benefits diffused throughout the industry to provide consumers lower costs and better quality service. To compete, non-CRS airlines wanted CRS benefits diffused through the industry with CRS access at reasonable rates. On the other hand, dominant-CRS-owning airlines sought above industry rents, monopoly power, and a way to accumulate sufficient resources to withstand the cyclical nature of the industry. The ideas of vertical integration and allowing airlines to capitalize upon radical innovations are consistent with empty core theorists, who are concerned about the long-term health of airlines and the industry.

8b. Therefore free market proponents believe radical innovation should be primarily used for the benefit of consumers, and secondarily for the benefit of the industry. Empty core theorists believe radical innovation can

be used to bridge the empty core if benefits are used primarily for the innovator and industry in providing above industry rents and consumers will ultimately benefit as a result of a financial healthy industry and access to air services.

The GCSB Framework: Understanding Institutional Behavior

George, Chattopadhyay et al. (2006) integrate prospect theory (Kahneman & Tversky, 1979), threat-rigidity hypothesis (Staw et al., 1981), and institutional theory to explain how patterns of institutional persistence and change depend on whether decision makers view environmental shifts as opportunities for, or threats to legitimacy, and ultimately, resources.

George, Chattopadhyay et al. focus on "...how key decision makers' interpretations of environmental pressures are translated into organization actions that can potentially change institutions or help maintain them (George et al., 2006, p. 347). George, Chattopadhyay et al. use their framework (GCSB Framework) to predict how key decision makers will respond to environmental pressures that influence the legitimacy of their organizations and how they process information under conditions of risk and uncertainty. Decision makers' perception of environmental pressures as a threat or an opportunity similarly drive them to respond isomorphically or nonisomorphically.

One of the bases of their framework is prospect theory. Prospect theory (Kahneman & Tversky, 1979) proposes that decision makers evaluate the prospect of losses or gains of resources relative to some standard established in their minds, or a reference point. The potential to lose a resource makes decision

makers more likely to select risky behaviors to prevent that loss (or nonisomorphic behavior). The decision maker is less willing to place at risk his/her resources, and will seek less risky behavioral responses to opportunities to gain resources (an isomorphic response). In the case of key resources, as previously discussed in this chapter, a decision maker will attempt more risky behaviors to ensure he/she does not lose control of them. However, to build upon key resources, the decision maker will not exhibit such risky behavior.

Another basis of the GCSB Framework is the threat rigidity hypothesis. The threat-rigidity hypothesis (Staw et al., 1981) explains how decision makers evaluate threats and opportunities as part of their framing of environmental pressures exerted on decision makers and their organization. In the face of a 'threat,' organizations and decision makers tend to 'rigidly' pursue routine activities (or isomorphic activities). As George, Chattopadhyay et al. explain, "By adhering to these well-established routines, decision makers attempt to regain control over that which seems uncontrollable" (George et al., 2006, p. 350).

The airline industry post-Deregulation represents an industry undergoing severe environmental pressures both to change institutions and/or maintain them and a multitude of crises. These crises will, according to the researcher's hypothesis, generate radical innovations, a key resource. As outlined in Table 3, radical innovators will exhibit nonisomorphic behaviors to ensure they do not lose this key resource. If however, an innovator has an opportunity to add to this key resource, he/she will not want to risk much to increase his/her existing stockpile

Table 3
Institutional Persistence and Change

	Potential Loss	Potential Gain
Control of Resources	(1) Nonisomorphic response	(2) Isomorphic response
Control of Environment	(3) Isomorphic response	(4) Nonisomorphic response

Note: From "Cognitive Underpinnings of Institutional Persistence and Change," by E. George, P. Chattopadhyay, S. Sitkin, and J. Barden, 2006, *Academy of Management Review*, 31, p. 349.

of key resources at the prospect of losing "it all," and will respond isomorphically.

Because the industry environment was so volatile after Deregulation, decision makers were faced with uncertainty and were predicted to act 'rigidly' to any threats in their attempt to "regain control over the uncontrollable" or isomorphically. But, if decision makers perceived they could stabilize their environment such that they could gain legitimacy, and ultimately secure future resource flows, then the decision maker would be willing to take nonisomorphic responses to ensure that end.

The GCSB Framework (see Table 3) categorizes institutional responses as either isomorphic or nonisomorphic. Isomorphic responses to crises are those that are in conformity with the responses of other organizations in the environment and carry low risks (George et al., 2006). Examples include taking similar actions, practices (Mezias, 1990; S. B. Sitkin & Sutcliffe, 1991; Zilber, 2002), utilizing rhetoric (Elsbach & Sutton, 1992; Sim B. Sitkin, Sutcliffe, & Reed, 1993), and structures (Fligstein, 1985). Nonisomorphic responses to crises are those that are not in conformity with the responses of other organizations and, accordingly, are often associated with relatively high levels of risk. Examples

include challenging the legitimacy of established ways and creating new ways of viewing and doing things (Cardinal, Sitkin, & Long, 2004; Covalleski & Dirsmith, 1988; Garud, Jain, & Kumaraswamy, 2002).

George, Chattopadhyay et al. (2006) divide crises responses into a matrix based on whether decision makers perceive the crisis as a potential opportunity to gain or lose and whether they feel the crisis is over a matter of resource control or control over the environment. A company can exercise control over their business environment in any number of ways. For example, by keeping stakeholders satisfied by conforming to normative expectations (Elsbach & Sutton, 1992), receiving professional approval (S. B. Sitkin & Sutcliffe, 1991), copying organizational structures (Newman, 2000), or acquiring legitimacy (DiMaggio & Powell, 1983). Legitimacy is difficult to acquire and measure. Tolbert and Zucker (1983) argued that legitimacy is earned by governments through the adoption of civil service reform and that this legitimacy ensured the continued flow of resources. Galaskiewicz (1991) argued that the Minneapolis-St. Paul business community had to institutionalize their philanthropic practices in order to gain legitimacy and ensure continued corporate donations. Being perceived as legitimate by funding sources is therefore directly related to an organization's ability to gain or lose resources (George et al., 2006). If an organization gains legitimacy it is able to exert more control over its environment (George et al., 2006) and improves its ability to successfully implement its strategies. If an organization has a low level of legitimacy, the organization loses its ability to control its environment, and may be forced by stakeholders to accept

what are normal practices for the industry (George et al., 2006). Texas Air Corp. (Texas Air), for example, earned large gains when it purchased blocks of National Airline stock in an attempt to thwart its merger with Pan American World Airways (Pan Am). When Texas Air attempted a hostile takeover TWA, it was given serious attention not only by TWA but the rest of the industry and Wall Street. Texas Air completed a hostile takeover of Continental Air Lines (Continental) and Texas Air's prowess as a takeover artist was confirmed and legitimized. Texas Air used its legitimacy to access Wall Street capital and purchase Eastern, People Express (People), and other airlines.

In later chapters, the GCSB Framework will be used to analyze the CRS and Hub and Spoke innovations as they move in time through the innovation cycle, examining both isomorphic and nonisomorphic responses to the potential gains or loss of resources or control of the environment.

Focus of the Study

This study of innovation in the airline industry since Deregulation will focus on three primary concerns. The first is the survivability of the industry as viewed through two lenses, the free-market view and empty-core theory, asking which best comports with the behavior of industry players since Deregulation. The second is the role of radical innovation and free markets in the service of industry survival and the public good. The central question there being: Can innovation with appropriate regulatory actions be used to bridge the empty core should it exist? The third focus of this study is the complexity of institutional relationships in the industry that makes sustainable innovation and change exceedingly

difficult, and complicates strategic thinking and choice in an increasingly global arena.

The study is comprised of two qualitative historical cases, the Computer Reservation System (CRS) and the Hub and Spoke system. The CRS is a radical technical innovation, whereas the Hub and Spoke system was originally an operations solution for moving passengers efficiently around route systems. However, under the intense competition unleashed by Deregulation, the Hub and Spoke evolved into a radical innovation which strategically employed key resources as barriers to entry and eventually yielded above industry rents. Both cases are traced from their origins in the 1950s through their evolution into radical innovations. Particular attention is paid to the crises that propelled these innovations into radical innovations, often at the unwitting hand of government. Attention is also paid to the innovators' resistance to the diffusion of their radical innovations and efforts by competitors to gain access to these key resources. The tensions between innovator, competitors, government, and other key stakeholders are examined using the GCSB Framework.

Research Questions

Free Markets versus Empty Core

The primary question of this thesis is whether this industry can financially survive under its current regulation structure. The industry is analyzed through two lenses: the free-market view versus empty core theory. Each view presents vastly different policy decisions and solutions to the industry's financial problems. If the findings of this thesis hold for the free-market view, then solving the airline

industry's current financial woes is best achieved by removing all remaining regulations. As will be shown in the institutional persistence and complexity part of this thesis, the dismantling of regulation and institutions is a daunting challenge. If the findings of this thesis hold for the empty core theory, then the industry must in some measure be reregulated, with all the practical, economic, institutional, and political complications that implies.

Crisis and Innovation

The secondary question of the thesis relates to the relationship between crisis and innovation, or more specifically, radical innovation. If radical innovations are created, who should benefit from these innovations? If the free-market view offers the best long-term solution to the financial crisis of the industry, should radical innovations be used to further free markets and the public good by providing more low cost fares, better quality service, more customer choice, and improvements to the national airspace and airports? Or, should the innovator receive the primary benefits and should government antitrust efforts be reduced? If the evidence more fully supports the empty core hypothesis, can radical innovations be used to bridge the empty core so that innovative airlines can survive in the long term and provide the public with air service? Or, should radical innovations be diffused throughout the industry so that the whole industry can survive to provide the public with air service? While these questions may not be fully answerable from the historical narrative, it is the purpose of this research to

advance the discussion and contribute to a deeper understanding of the issues affecting important policy decisions looming on the horizon.

Institutional Persistence and Complexity

The third focus of this study is institutional persistence, a major roadblock to change. Regardless of whether the industry's financial woes are best solved with freer markets or a return to regulation, change is hard to make in complex industries. As will be seen in the cases, the government's actions, particularly antitrust actions, have often had the unintended consequence of exacerbating crises and leading to greater barriers to entry and increased marketing power. Institutional persistence and complexity are particularly evident in the Hub and Spoke case. In framing a long-term financial solution to the airline industry's problems, a deeper understanding of this complexity is required or any attempts at change will be thwarted by institutional persistence.

In summary, this research evaluates concepts of free markets versus empty core, crises and innovation, and institutional persistence and complexity against two historical case studies, the CRS and the Hub and Spoke system. The case work delves into the creation and use of radical innovations that allowed innovators to receive above industry rents and build market barriers, and efforts by competitors and the government to dissipate those radical innovations into the industry for the benefit of consumers. These case histories examine whether the free market view or the empty core theory best explains the industry post-

Deregulation and attempt to explain which view offers the industry its best chances for survival in the long term. Finally, change is difficult, whether at the company level or the industry level. Despite 30 years of deregulation, institutional persistence and complexity hinder the industry's move to truly free markets.

The following two sections present the historical data for the two cases — CRS and Hub and Spoke — as well as an analysis of the cases using the economic, strategy, and organizational behavior literature outlined in this chapter. The analyses establish the existence of the CRS and Hub and Spoke as radical innovations created during times of crises as postulated by Raider (1998). Then, using the GCSB Framework to analyze how change occurs in the airline industry, the innovators', competitors', and government's responses to crises and radical innovations are assessed in terms of free market or empty core theory. Finally, the innovation – regulation cycle examines, particularly the government response, as it impacts the industry and players, leading to conclusions as to whether a radical innovation can indeed be used to improve the financial condition of the industry.

Endnotes

1. An isomorphic response is consistent with the responses of other legitimate actors in the industry. Conversely, a nonisomorphic response departs from what is considered legitimate in the industry (George et al., 2006, p. 348)

There are three types of isomorphic responses: mimetic, coercive, and normative. Mimetic responses, the most common, include modeling after industry leaders or following their lead in times of crises. Coercive responses include using political influence and raising questions of legitimacy. Normative responses are usually professionalization of an industry or institution, often by consultants (DiMaggio & Powell, 1983, p. 150).

2. Legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions (Suchman, 1995, p. 574).

CHAPTER 3

INDUSTRY ECONOMICS 1973 TO PRESENT

The industry contains certain economic and financial characteristics that should be reviewed to properly put the industry in perspective before analyzing crises, innovations, empty core theory, and the free market perspective. The quantitative data in this chapter provides a strong foundation for the reader to understand the broader financial problems facing the industry since Deregulation. This quantitative data adds to the empty core versus free market debate and assuages some of the doubts researchers have regarding qualitative research.

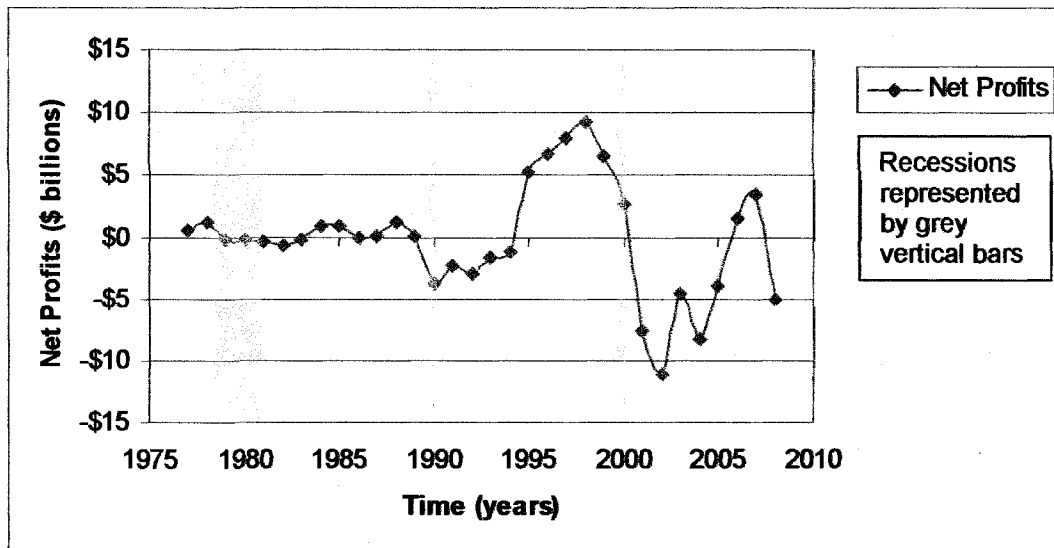
Aspects of the airline industry were deregulated by the Airline Deregulation Act of 1978; however, as industry analysts observed, the industry was sensitive to economic cyclical swings, both before and after Deregulation. For instance in 1977, Standard and Poor's analyst T. Canning reported that "Although the industry has exhibited a strong long-term secular growth trend, the stocks of airline carriers are highly sensitive to cyclical swings in the economy." (Standard & Poor's, 1977, p. 89), and in 1982, he noted that "Deregulation, having removed previous barriers to market entry and pricing flexibility, the industry has become more susceptible to swings in the business cycle" (Standard & Poor's, 1982a, p. A59). Later, reflecting on the decade of the 1980s, Canning commented that "In the 1980s, the major airlines saw positive returns in only five years...net margins of 2.5 percent in 1984, 1.5 percent in 1985, 0.2 percent in 1987, 3.2 percent in 1988, and 0.2 percent in 1989...[providing] clear

evidence of the highly cyclical nature of the group" (Standard & Poor's, 1992, p. A43).

Moreover, the industry experienced a difficult economic period post-Deregulation. According to the National Bureau of Economic Research (2006) recessions occurred in 1974-1975, coincident with the Organization of Petroleum Exporting Countries (OPEC) oil crises; 1980-1982, coincident with jet fuel decontrol and the Professional Air Traffic Controllers' strike (PATCO strike); 1990-1991, coincident with Gulf War I; and 2001, coincident with the 9/11 terrorist attack, Gulf War II, and high oil prices. The recession of 1974-1975 was considered a major recession, defined as long in duration (number of months) and great in magnitude (percentage change from peak to trough of economic output). From 1973 to 1983, the country actually faced what is called stagflation, characterized by rapidly increasing prices caused by supply shocks (i.e., fuel and agriculture). Countries, including the US, placed price controls on oil, a critical commodity for airlines. Airlines were unable to get enough fuel for routes in the West and Pacific Basin. Federal Reserve policy makers increased interest rates to historic highs. It was during this period of recession, stagflation, and oil shortages that Deregulation was approved.

Figure 6 shows the industry's¹ net profits and losses from 1977-1994 and the largest ten airlines' net profits and losses from 1995-2006. As you can see, net profits declined as the economy experienced a recession, a loss of consumer confidence, fears of terrorism/wars, or high fuel prices. Note that airline net profits start to fall before recessions and lag after recoveries, suggesting that

Figure 6
Airline Profits with Economic Recessions 1977 - 2008
(2007 - 2008 estimated data)



Note. The data from "Business Cycle Expansions and Contractions," by the *National Bureau of Economic Research*, 2006, San Francisco: National Bureau of Economic Research, and *Standard & Poor's Airlines Industry Surveys*, by Standard & Poor's, 1977-2007, New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission); "Airlines Will Lose Money in '08," by G. Raine, *San Francisco Chronicle*, p. C1-C2. Estimated profit/loss for 2007-2008.

and July 1981 to November 1982, followed by a minor recession from July 1990 to March 1991. The period from April 1991 to October 2001, at over 10 years long, was the longest period of prosperity in US history. The next recession, defined as minor, was from March to November 2001. This recession coincided with the 9/11 terrorist attack and was followed by Gulf War II. Both Gulf Wars led to instability in oil markets and soaring prices. Estimated data is provided for 2007 (Standard & Poor's, 2007) and 2008 (Raine, 2008).

While no recession can be predicted, the International Air Transport Association, a leading trade group, expects that unprecedented fuel prices and

slowing economic growth, particularly in the US, will wipe out much of the airline industry's profits in 2008 (Clark, 2007; Raine, 2008). Giovanni Bisignani, the association's director general said, "The peak of the business cycle is over, and we are still \$190 billion in debt. So we could be heading for a downturn with little cash in the bank to cushion the fall" (Clark, 2007).

Industry Characteristics

The airline industry exhibited unique characteristics that led the Civil Aviation Board (CAB) and its predecessor to regulate the industry from 1936-1978. The industry was marked by high ratios of fixed to variable costs; high concentration in which a small number of airlines control much of the market; seasonal and cyclical sensitivity to the business cycle and interest rates; a discretionary and perishable product; and no New Entrants. Pre-Deregulation, CAB blocked entry of all new trunk carriers and granted operating certificates (i.e., routes) that provided airlines with monopoly or near monopoly routes, reasonable returns, and a key resource that could be collateralized. By contrast, the primary goals of Deregulation were to open markets to all airlines that were "fit, willing, and able," allow market exit, price competition, scheduling flexibility, and innovation. With free market entry, New Entrants entered the industry and Incumbents sought new routes. Prices, yield, and industry profitability plummeted as Incumbents and New Entrants battled for market share.

The period after Deregulation has been characterized by unlimited entry, mergers, bankruptcies, fare wars, and low revenues. Prior to Deregulation the industry had a small protected set of major airlines (Majors); after Deregulation,

despite New Entrants, the number of Majors remains small, ranging from nine to fifteen because of intense competition, mergers and acquisitions, low profitability, and bankruptcies.

Regardless of the number of passengers on a flight, 80% of airline costs are fixed. Examples of fixed costs are maintenance, insurance, depreciation, landing fees (Standard & Poor's, 1976), airport fees, and capital costs. Most importantly, the industry has large capital requirements (i.e., airplanes, airport facilities, and technology) with long depreciation periods. The remaining 20% of airline costs include labor and fuel costs. Labor contracts can fix costs for years but are still considered variable in standard business procedures because it can be liquidated if necessary. Once labor rates are established for one airline, those labor rates become the industry's benchmarks. Labor costs represent the largest variable cost, ranging from 20% to 40% of operating costs. Fuel is the second largest variable cost, ranging from under 5% to more than 30% percent of operating costs. Fuel was 30% in 2007, up from just over 10% in 1997 (Clark, 2007). While labor and fuel costs are considered variable, airlines have little control over them in the short term. This cost structure makes the industry sensitive to the business cycle.

The industry's large capital needs make them sensitive to interest rates. Because of the continuous demand for capital investments (e.g., airplanes, airport improvements, technology), the industry is constantly in the market to finance its needs. That, coupled with high debt ratios and weak credit quality, make airlines subject to the highest interest rates. When capital markets close or

liquidity evaporates, as happened prior to the 1991 recession and the recession of 2008, no loans are available regardless of interest rates. This puts an industry, like the airline industry, in even more dire financial straits.

The industry is not only cyclical with respect to the business cycle, but also seasonal (i.e., summer and holidays versus winter months). Therefore, airlines must accumulate capital or establish credit lines during profitable times to accommodate them during lean times. Furthermore, the airline seat is a perishable product with no shelf life. Once a plane departs, the inventory is extinguished. Finally, airline travel is discretionary: during recessions, leisure travel evaporates and businesses cut back, as is also the case when fears of terrorism, wars, and pandemics (i.e., SARS) are heightened. Managing resources with high fixed costs and fluctuating demand in a highly competitive market creates significant challenges for the industry, as will be examined more closely later.

Assessing Economic Performance

Three measurement tools are used in this research to assess the financial health of companies and the industry: profit and loss statements (P&L), debt to capital ratios, and economic value added (EVA). Annual P&Ls are the standard measurement of a company and industry's past performance. Debt to capital ratios determine a company's leverage, credit worthiness, and ability to access capital markets. This ratio provides a view of a company's future. A third measure of a company and industry's value and performance is its EVA, which adjusts net operating profit after taxes for the equity cost of capital and for certain

economic distortions that occur when applying Generally Accepted Accounting Principles (GAAP). I will examine each of these in turn.

Profitability

Standard & Poor's (S&P) data were used to assess profitability because it is the most consistent, long-term data available, providing data for the period 1977-2007. The data is shown in Table 4 and previously in Figure 6. The vertical bars in Figure 6 represent recessions, as classified by the National Bureau of Economic Research. Table 4 and Figure 6 indicate:

1. The industry experienced greater volatility as the industry moved further away from Deregulation (1978), as indicated by the greater swing in amplitude of profit on the vertical axis. One would expect the industry to adjust to the deregulated model as it moved further in time from the Deregulation Act, but the opposite occurred.
2. While the first recession (1980-1982) after Deregulation was a major recession, the financial impact on the industry was less severe than subsequent minor recessions (1991 and 2001). One would expect major recessions to have a greater impact on the industry than minor ones, but the opposite occurred.
3. The industry is unable to build ample reserves during economic expansions to cover costs during economic contractions. One would expect the industry to build ample reserves in anticipation of a recession. However, the losses incurred due to the recession were greater than the

Table 4
Airline Industry Key Financial Indicators (profits in \$ millions)

Time Period	Debt to Capital Ratio	Profit/(Loss) (annual)	Profit/(Loss) (cumulative)	Companies with positive EVA's
1965		\$367		
1966-1975		\$160/yr avg.		
1974-1975 (recession)	68%			
1976	54%			
1977	57%	\$611	\$611	
1978	51%	\$1,200	\$1,811	1 of 7
1979	56%	(\$242)	\$1,569	
1980 (recession)	58%	(\$176)	\$1,393	
1981 (recession)	58.4%	(\$379)	\$1,014	
1982 (recession)	65%	(\$735)	\$279	
1983	67%	(\$249)	\$30	2 of 7
1984	58%	\$840	\$870	
1985 (stage II noise compliance)	59%	\$852	\$1,722	0 of 6
1986	54%	(\$69)	\$1,653	0 of 6
1987	58%	\$70	\$1,723	0 of 6
1988	58%	\$1,170	\$2,893	1 of 6
1989	49%	\$115	\$3,008	0 of 6
1990 (recession, Gulf War I)	N/A	(\$3,800)	(\$792)	0 of 6
1991 (recession)	54%	(\$2,300)	(\$3,092)	0 of 6
1992	71%	(\$3,000)	(\$6,092)	0 of 6
1993	67%	(\$1,700)	(\$7,792)	1 of 8
1994	69%	(\$1,200)	(\$8,992)	0 of 8
1995	64%	\$5,200	(\$3,792)	3 of 8
1996		\$6,600	\$2,808	2 of 8
1997		\$7,880	\$10,688	4 of 8
1998		\$9,230	\$19,918	5 of 8
1999 (stage III noise compliance)		\$6,490	\$26,408	3 of 8
2000		\$2,670	\$29,078	2 of 8
2001 (recession, 9/11)		(\$7,600)	\$21,478	0 of 8
2002		(\$11,100)	\$10,378	0 of 8
2003 (Gulf War II)		(\$4,500)	\$5,878	0 of 8
2004 (Gulf War II)		(\$8,200)	(\$2,322)	0 of 8
2005 (Gulf War II)		(\$4,000)	(\$6,322)	0 of 8
2006 (Gulf War II)		1,600	(\$4,722)	0 of 8
2007 (Gulf War II)		~\$3,400	~(\$1,322)	
2008 (recession, Gulf War II)		(~\$5,000)	~(\$6,322)	

Note: Profit/(Loss) data for 1965-1994 represents the entire airline industry, and for 1995-2007 represents the 10 largest airlines. Data from *Standard & Poor's Airlines Industry Surveys*, by Standard & Poor's, various years, New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission); "Airlines Will Lose Money in '08," by G. Raine, *San Francisco Chronicle*, p. C1-C2; "Business Cycle Expansions and Contractions," by National Bureau of Economic Research, 2006, San Francisco: National Bureau of Economic Research; EVA Dimensions; "The Stern Stewart Performance 1000," by R. Irwin, 1999, *Journal of Applied Corporate Finance*, 11, pp. 122-134; and *The Quest for Value*, by G.B. Stewart, III, 1991, New York: Harper Business.

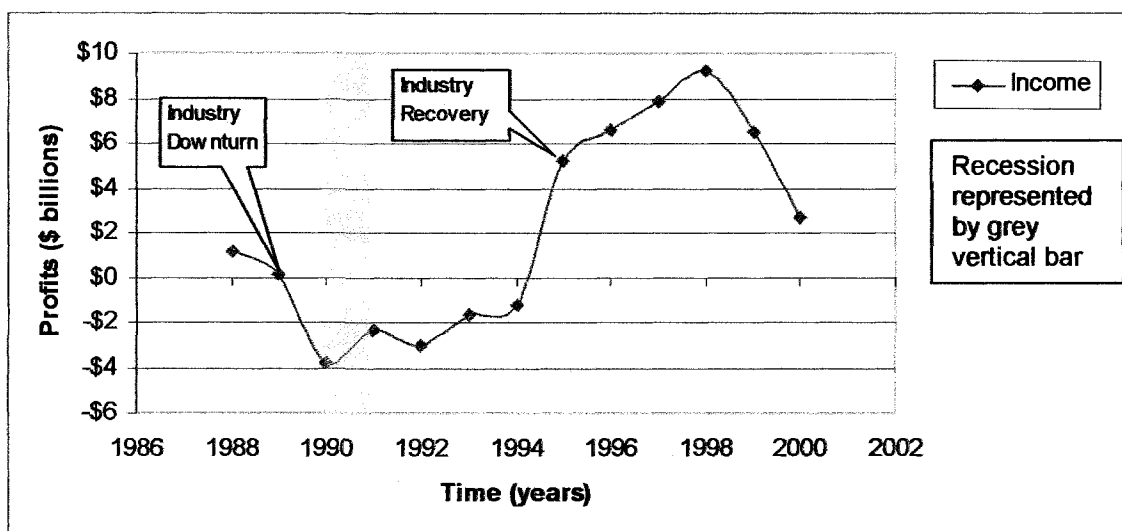
profits earned in the period preceding the recession. As indicated in Table 5 and with data from Table 4, the \$3 billion earned during the recovery period of 1984-1989 was insufficient to cover the \$12 billion industry loss suffered as a result of the recession of 1990-1991. The \$38.1 billion earned during the recovery period of 1995-2000 was barely sufficient to cover the \$35.4 billion industry loss suffered as a result of the 2001 recession and 9/11 attack, but only because \$21 billion of government subsidies were provided. Without those subsidies, the industry would have suffered a loss of \$56.4 billion, far greater than the \$38.1 billion earned during the 1995 - 2000 recovery period. The estimated profits of \$5 billion earned in 2006 - 2007 are expected to be eliminated in 2008. Since 2008

Table 5
Airline Industry Profits and Losses before and after Recessions

Period	Profits	Losses
1984-1989	\$3 billion	
1990-1994		(\$12) billion
1995-2000	\$38.1 billion	
2001-2005		(\$35.4) billion (\$56.4) billion without government subsidies
2006-2007	~ \$5 billion	
2008		~ (\$5) billion

Note: The data from *Standard & Poor's Airlines Industry Surveys*, by Standard & Poor's, 1977-2007, New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission.) and "Airlines Will Lose Money in '08," by G. Raine, *San Francisco Chronicle*, p. C1-C2. Estimates for 2007 and 2008.

Figure 7
Airline Industry Business Cycle 1989 – 2000



Note: Data from Standard & Poor's Airlines Industry Surveys, by Standard & Poor's, various years, New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission) and "Business Cycle Expansions and Contractions," by National Bureau of Economic Research, 2006, San Francisco: National Bureau of Economic Research.

is the beginning of a recession, losses are expected in succeeding years.

Figure 7 and Table 6 indicate that the airline industry displays a mixed-business-cycle:

1. The airline industry is one of the first industries to sense an economic downturn with a drop in income/loss. While other industries took immediate advantage of economic recoveries, the airlines lagged. The industry displayed a mixed-business-cycle indicator. Figure 7 shows the industry's and top ten airlines' profit and losses, covering one business cycle from 1989 to 2000. As this figure indicates, the industry sensed the decline in demand prior to the 1990-1991 recession with a drop in income beginning in 1989. The airline industry did not earn profits until 1995, well

Table 6
Difference in Airline Industry Participation Rates in Economic Expansions

Economic Recession and Expansion Periods		Airline Industry Expansion Period	Economic Expansion Period	Difference between Airline Industry vs. Economic Expansion Periods
<i>Recession</i>	<i>Expansion</i>			
1980-1982	1983-1989	5 years	7 years	(2 years)
1990-1991	1992-2000	5 years	9 years	(4 years)
2001	2002-2007	2 years ^a	6 years	(4 years)

Note: (a) assumes a recession for 2008 ("Airlines Will Lose Money in '08," by G. Raine, *San Francisco Chronicle*, p. C1-C2). Data from *Standard & Poor's Airlines Industry Surveys*, by Standard & Poor's, various years, New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission) and "Business Cycle Expansions and Contractions," by National Bureau of Economic Research, 2006, San Francisco: National Bureau of Economic Research.

after the economic expansion began in 1992.

2. Table 6 shows the airline industry expansion period to be shorter than the economic expansion period. The 1980 - 1982 recession was followed by an economic expansion period of seven years. The industry was only profitable for five of those seven years leaving a shortfall of two years when the industry did not participate in the economic expansion. One shortfall year (1983) was attributable to the lag in recovery following an economic expansion and the other shortfall year (1989) was due to the industry's early sensing of the next economic downturn. The 1990 - 1991 recession was followed by an economic expansion of nine years. The industry participated in the expansion for five years with a shortfall of four years. The four shortfall years were due to the recovery lag following an economic expansion. The industry's decline in profits began in 2000. The

economic expansion following the 2001 recession has led to minimal industry participation. A recession in 2008 allows the industry to participate in two years of economic expansion, or a shortfall of four years. The industry participated in fewer years of economic expansion as the industry moved further in time from Deregulation. Table 6 shows this reduced participation, the last column delineating the difference between the airline industry's expansion and economic expansion periods. The industry's expansion periods are growing too short to gain full benefit from economic expansions.

P&L data present a bleak picture of the industry. Volatility is increasing; any economic recession impacts the industry (though it is possible that a major recession in the future may have a greater impact than a minor recession); the industry is unable to build sufficient reserves to withstand the next recession; and the recovery period in which the industry is able to earn profits is decreasing. It is questionable whether, under current government regulations, the industry can withstand any serious economic or other crises in the future without significant long-term consequences.

Debt to Capital Ratios

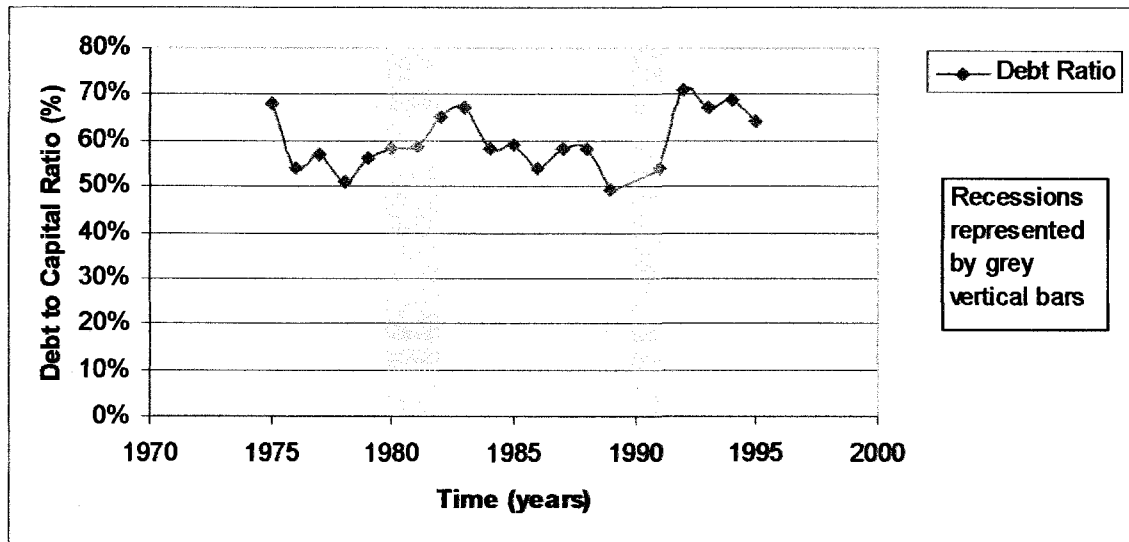
The debt to capital ratio is defined as the long-term debt of a company, excluding current, short-term debt, divided by the total invested capital (Standard & Poor's, 1986). A ratio of 50% or less is considered "good" for the airline industry due to its high fixed costs and large capital requirements. A ratio of zero percent means a company has no long-term debt. A ratio of 100% means a

company financed its total capital with long-term debt. Company and industry debt ratios were obtained from S&P. After 1996, S&P ceased publishing the industry ratio, with no comparable ratio available. A company's inclusion in the S&P airline industry ratio is predicated on inclusion in the S&P 500 Index. Bankrupt and merged companies are eliminated. Only one passenger airline remained on the S&P 500 Index in 2005, Southwest. Southwest's debt ratios were below the industry debt ratio 18 of 20 years (1975 – 1996). In 11 of those 18 years, Southwest's debt ratio was significantly below the industry debt ratio (by 40% – 62%).

A review of airline industry and companies' debt to capital ratios over the past thirty years reflects the financial viability of the industry to providers of capital. Debt ratios are an indicator of a company's financial health: credit worthiness, leverage of existing capital and its collateralization, and ability to access capital markets in the future. When debt ratios become too high, a company teeters on the edge of bankruptcy, as evident when Continental, Delta, and United, with very high debt ratios, went bankrupt. Investors flee and access to capital evaporates. Companies can no longer work on meaningful future plans for the company (i.e., investments in airplanes, hub operations, technology, mergers), but must manage day-to-day survival.

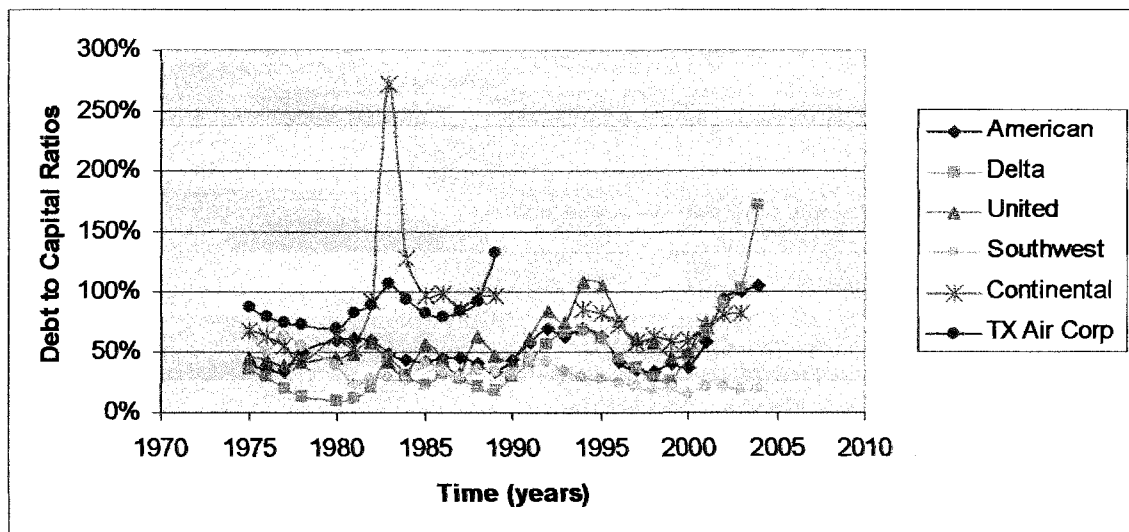
Table 4 and Figure 8 show the S&P industry's debt to capital ratios from 1974 - 1995. Industry debt ratios increased as recessions took their toll on businesses, consumer confidence, and discretionary income. Recessions, and

Figure 8
Airline Industry Debt to Capital Ratios 1975 – 1995



Note: From Standard & Poor's Airlines Industry Surveys, by Standard & Poor's, 1976-1995, New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission.)

Figure 9
Select Companies' Debt to Capital Ratios 1975 – 2004



Note: Texas Air Corp, parent of Texas International, purchased Continental in 1982, Eastern in 1986, People Express in 1986, and Frontier and Rocky Mountain in 1987, and started New York Air in 1980. In 1994, Texas Air was renamed Continental Airlines Holding and is indicated as Continental thereafter. Data were from Standard & Poor's Airlines Industry Surveys, by Standard & Poor's, 1976-2005, New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission.)

the period preceding and following recessions, saw worsening debt ratios.

Economic expansions are used by companies to repair balance sheets, improve debt ratios, commit capital, and manage competing stakeholder demands (i.e., stockholders, creditors, employees) who were constrained during lean years. The industry achieved a “good” 50% ratio in 1957, 1977, 1989, and 1996.

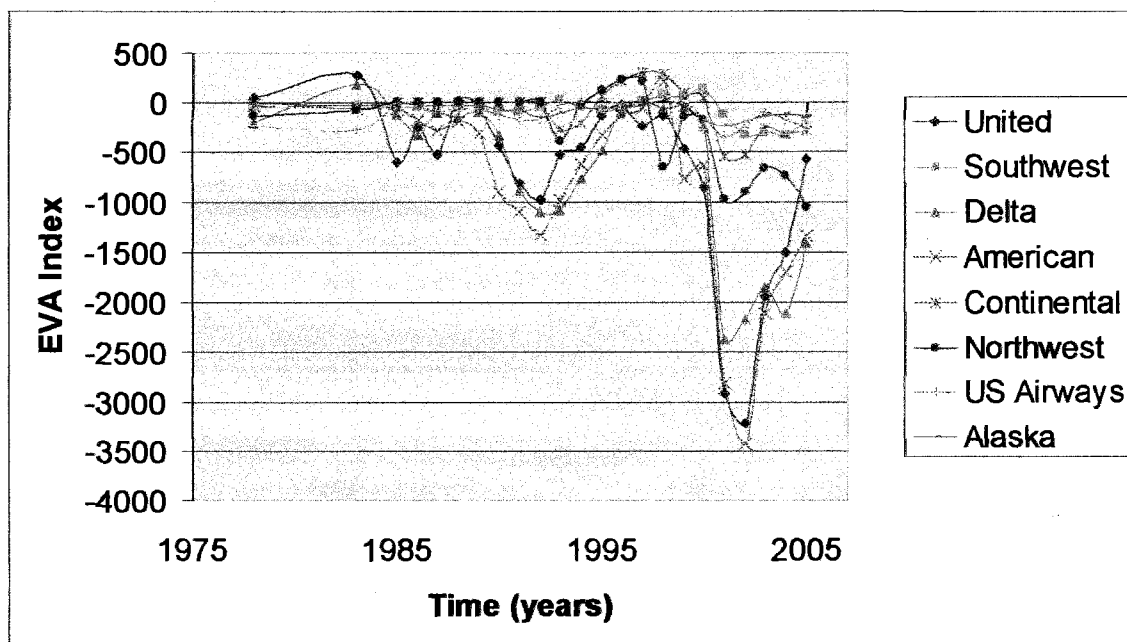
Other than Continental and its parent, Texas Air, other airlines operated within normal debt ratio ranges until 1992 as shown in Figure 9. Continental entered its second bankruptcy in 1991, and was renamed with its parent, Continental Airlines Holdings, in 1994. Continental continued with low debt ratios through 1994. United formed an employee-owner governance structure in 1992 and had high debt ratios through 1998. After the 2001 recession and 9/11, debt ratios for the ten largest airlines, except Southwest, reached historic highs. Debt ratios soared as high outflows (millions of dollars/day) were required to cover airlines' high fixed costs and dramatically reduced revenues. Airlines, trying to maintain liquidity, sold bonds if capital markets were open, or maximized credit lines. Some company debt ratios, like American, exceeded 100% of long-term capital. Others also had high ratios such as Continental. Northwest, United, and Delta went bankrupt. The airline industry is severely constrained by its debt ratios, which make it unable to expand, implement strategies, or buy more fuel efficient airplanes, and have increased sensitivity to rising fuel costs, economic recessions, and other crises. High debt ratios limit the companies' abilities to respond to a competitive environment.

Economic Value Added

Stern, Stewart et al.(1995, p. 40) define Economic Value Added (EVA) as “net operating profit after taxes less a charge for the capital employed to produce those profits. The capital charge is the required, or minimum, rate of return necessary to compensate all the firms’ investors, debt holders as well as shareholders, for the risk of the investment.” It attempts to avoid the conservatism and distortions produced by GAAP and bookkeeping entries (Stewart, 1991). Examples of items treated differently using EVA are depreciation periods; goodwill amortization; deferred taxes; last-in, first-out inventory (LIFO) reserves; operating leases; deposits; and subscriptions. If investors focus on EVAs, they should benefit with increasing returns derived from assets directing additional capital to businesses as long as returns exceed the cost of capital and stop investments that produce substandard returns (Stern et al., 1995). A negative EVA value means investors’ value is being destroyed (Stewart, 1991).

Stern Stewart & Company and EVA Dimensions (2007) produce the Stern Stewart Performance 1000. Figure 10 shows eight Majors’ EVAs from 1978 to 2005. The most notable result was the industry’s failure to produce EVAs significantly above zero during the entire period. Most airlines had negative EVAs from 1978 to 2005. Of the 166 EVA calculations in Table 7 and Figure 10, only 24 EVAs had positive results. Six of the positive EVA results were produced by Continental’s emergence from bankruptcy in 1994, providing Continental with the best industry EVA results over the study period. Southwest had the second best EVA results with five positive EVAs. The eight companies from 1978 to 2005

Figure 10
Select Companies' Economic Value Added 1978 – 2005



Note: The data from EVA Dimensions, 2007; "EVA 1000 Performance List," by Stern, Steward & Co, *Journal of Applied Corporate Finance*, various years; *The Quest for Value*, by G. B. Stewart, III, 1991, New York: Harper Business.

produced positive EVAs 14% of the time (see last column of Table 4). This means investors' investments were greatly diminished most of the time by substandard returns.

The second notable result was Southwest's EVAs. Southwest is touted as the most successful US airline and Deregulation's poster child of New Entrant's success. If Continental's EVA results were excluded because of bankruptcy distortions, Southwest was the airline that returned the most economic value to investors. Five years of positive results, however, does not eliminate 18 years of negative returns on investment. Southwest's EVA results contradict traditional debt ratio values. Southwest's debt ratios were below 50%, which is considered "good" for the industry. Southwest's current debt ratios motivate investors to

Table 7
Select Companies' Economic Value Added 1978 – 2005

	Alaska	American	Continental	Delta	Northwest	Southwest	United	US Airways
1978	(16)	(29)		(214)	(132)	(41)	41	(240)
1983	(24)	(55)		183	(67)	(34)	273	(262)
1985	(18)	(56)		(118)		(44)	(592)	(11)
1986	(22)	(183)		(330)		(37)	(251)	(29)
1987	(25)	(286)		(99)		(81)	(520)	(75)
1988	(29)	(197)		(147)		(57)	20	(66)
1989	(34)	(320)		(85)		(55)	(44)	(52)
1990	(70)	(901)		(328)		(79)	(437)	(116)
1991	(77)	(1,093)		(892)		(85)	(806)	(178)
1992	(149)	(1,316)		(1,091)		(35)	(968)	(160)
1993	(103)	(977)	(266)	(1,077)	(383)	31	(521)	(33)
1994	(64)	(614)	(206)	(769)	(30)	(38)	(450)	(2)
1995	(64)	(333)	64	(478)	122	(66)	(132)	23
1996	(58)	(134)	221	(93)	224	(58)	(33)	(8)
1997	(29)	(53)	308	21	220	14	(238)	(7)
1998	15	209	283	(55)	(645)	84	(137)	17
1999	(26)	(765)	99	(47)	(147)	67	(470)	1
2000	(175)	(625)	54	(242)	(177)	144	(850)	(145)
2001	(241)	(2,805)	(545)	(2,361)	(971)	(120)	(2,913)	(343)
2002	(199)	(3,430)	(521)	(2,157)	(895)	(320)	(3,220)	(257)
2003	(128)	(2,099)	(259)	(1,846)	(654)	(296)	(1,942)	(103)
2004	(119)	(1,695)	(318)	(2,098)	(732)	(335)	(1,498)	(174)
2005	(128)	(1,343)	(288)	(1,413)	(1,053)	(171)	(564)	(251)

Note: The data from EVA Dimensions, 2007; "EVA 1000 Performance List," by Stern, Steward & Co, *Journal of Applied Corporate Finance*, various years; *The Quest for Value*, by G. B. Stewart, III, 1991, New York: Harper Business.

provide access to capital (both stockholders and creditors). Based on EVAs, however, stockholders should not provide Southwest with additional capital.

Positive EVAs follow recessions. The industry did not significantly benefit from the economic expansion following the 1980-1982 recession. Positive EVAs did follow the 1990-1991 recession with three companies in 1995 (the first year the industry made a profit after the recession). Profitable EVAs (ranging from two to five

companies) continued until 2001 when the recession and 9/11 impacted the industry.

The EVA is a more realistic measure of the financial condition of the industry than P&L or debt ratios because it includes the cost of capital. The poor EVAs for the industry reflect high fixed costs and large capital outlays. Mergers lead to poor EVAs due to increased debt levels, and bankruptcies lead to better EVAs due to debt write-off and reduction of contractual costs.

However, as will be discussed at greater length in the Hub and Spoke case study in Section 3, the industry may need to consolidate and vertically integrate to improve profitability. Merger is a major strategy used in a declining industry as there is a potential to reduce merged company costs and industry excess capacity, leading to higher revenues. However, for an industry with unlimited competitive entry as in the airline industry, excess capacity remains a continual problem.

Another common strategy is bankruptcy as shown by Continental's achievement of the best EVAs in the industry over the study period. However, bankruptcy is problematic because at some point investors are unwilling to have their contracts renegotiated in bankruptcy court.

Clearly the airline industry, with its seasonal, perishable product; sensitivity to the business cycle; high fixed costs; large capital needs; inability to respond to recessions and shocks by reducing capacity; unlimited competitive entry; and nonexistent returns on capital, is in crisis. Volatility appears to be increasing. Decreased recovery periods from significant losses, lack of capital

access, and unwillingness of investors to invest long-term do not lead to attractive alternatives. There is concurrence between P&Ls, debt ratios, and EVAs that the airline industry is a poor investment. If investors flee the industry, creditors will soon follow, for the basic requirement of any company is to earn its cost of capital. If an industry is unable to earn its cost of capital it cannot survive in the long-run.

Free Market View versus Empty Core Theory

What does the financial data tell us about the industry? From a free market perspective, as regulatory restrictions are removed, the industry should adjust and become more financially well off over time. As will be seen in the case studies, the regulators made efforts to increase competition in markets, particularly attempting to dismantle barriers such as CRS (see Section 2) and Hub and Spoke (see Section 3) that limit entry. Despite these efforts and 40 years, all three financial measures confirm a worsening financial condition:

1. P&Ls show increasing volatility and the inability to recover from recessions with sufficient surpluses to carry over into the next downturn;
2. Debt ratios are deteriorating with increased bankruptcies and the inability of the industry to shoulder more debt to weather future crises or replace fuel-inefficient fleets that now average a little under 20 years old among the seven largest Majors (Bailey, 2007a); and
3. EVAs show the industry has not been profitable for shareholders during the entire period since Deregulation. While there was no EVA data for the pre-Deregulation period, one of the reasons for Deregulation was

concern over the poor financial health of the industry. Therefore, it is reasonable to assume that the pre-Deregulation and post-Deregulation eras most likely contain the same dismal EVAs.

As seen in Table 7, Continental, after it restructured its debt in its second bankruptcy, had the most number of years (i.e., six years) of positive EVAs for the industry. This implies that the amount of capital involved in creating a profitable airline business is too great to provide positive shareholder return and bankruptcy must be used to pare debt and contract obligations for the benefit of new shareholders of the reconstituted company. Southwest had the second most positive EVAs in the industry (i.e., 5 out of 23 years) but 18 years of negative EVAs is not a strong investor recommendation. 1998 was the year with the greatest number of airlines achieving positive EVAs (i.e., five of eight companies) and the last year of an industry expansion period before its dramatic decline into losses and bankruptcies (Figure 6). No airline had positive EVAs for the most recent five-year period (i.e., 2001 - 2005). P&Ls, debt ratios, and EVAs show a serious underlying financial condition of the industry that is getting worse, not better, the further in time the industry moves from Deregulation. The financial future of the industry is in question and the three financial measurements appear to lend support for the empty core theory and not the free market view.

In the previous chapter, a review of strategic responses to crises was analyzed against the backdrop of industry structure, including the innovation cycle as one of the strategic responses. The other strategic response was the use of key resources (Penrose, 1959; Wernerfelt, 1984) in achieving above

industry rents and sustaining competitive advantage. Also, because of the previous regulation of the industry and claims of "regulation's pernicious effects" (Winston, 1999), the ideas of institutional persistence and complexity will be covered.

Endnotes

1. Airline industry net profits are for the entire US airline industry from 1977-1994. Thereafter, net profits of the nine or ten major airlines, as defined by the DOT as having revenues in excess of \$1 billion/year, are used. These nine or ten major airlines provided 95.5 percent of the total revenues in 1999. The nine or ten major airlines (at varying times) were Alaska, America West, American, Continental, Delta, Northwest, Pan Am, Southwest, TWA, United, and US Airways.

SECTION 2

COMPUTER RESERVATION SYSTEMS

One of the tenets of Deregulation was to end government interference in the airline industry and stimulate innovation to the benefit consumers and the industry as a whole. The Computer Reservation System (CRS), later called a global distribution system (GDS), represents one such innovation.

In Chapter 4, the history of the CRS will be traced from its inception in the 1950s through multiple evolutions and into the Internet age of the 1990s. This historical review will allow the reader to examine the possibility that a major technological innovation can improve company and industry performance by increasing market competition and resolving empty core constraints. The chapter will also examine the resulting regulatory activities that either facilitated industry health or exacerbated its problems. Further, an historical review of CRS allows the reader to follow the radical innovation cycle described in Chapter 3: first, a series of crises inspire radical innovations; then the innovators take up dominant positions in the industry, including establishing above industry rents; followed by the subsequent radical innovation on the part of competitors to break through barriers and resolve crises created by the first radical innovation.

The role of crises and innovation will be explored in Chapter 5 as this particular innovation is developed and diffused throughout the airline industry. The case analysis will highlight the role of innovation and crises for free market proponents versus empty core theorists in the long-term survival of the industry.

The key issues of Chapter 3, crises, institutional complexity, innovation, and key resources, will be addressed in light of the GCSB Framework. Lastly, policy implications will be investigated and analyzed.

The primary actors in the development and use of CRSs were American and United. These two Incumbents led their CRSs to become information hubs of the travel industry. Followers included Continental, Delta, Eastern, Northwest, Texas Air, TWA, and US Airways (also known as USAir). Population outliers, who participated on the periphery of the CRS were Alaska Airlines (Alaska), JetBlue Airways (JetBlue), Pan Am, Republic Airlines (Republic), and Southwest. Other key stakeholders in the evolution of the CRS included travel agents (Agents) and government regulators.

Here is a simplified timeline of CRS innovation, which I will expand upon in Chapters 4 and 5:

1950: CRS' inception

1975: CRS is first marketed to Agents

1976 – 1983: Market is dominated by American Airlines' Sabre System and United Air Lines' Apollo System (later called Galileo)

1984 – 1991: CRS is first subject to regulation; a third CRS is developed, PARS (later called Worldspan); CRS evolves into a GDS

1992 – 2007: Department of Transportation (DOT) continues to regulate CRS; the Internet is used as an information and distribution system; creation of Orbitz; all airline-owned CRSs are sold to third parties.

CHAPTER 4

CASE STUDY: COMPUTER RESERVATION SYSTEMS

This chapter outlines the historical record of the Computer Reservation System (CRS) so the reader will glean not only the facts that led to its development and diffusion in the airline and travel industry, but also come to understand the historical background in which it was created. The CRS was a technical innovation, and thus was dependent on many factors occurring within the broader business world and technology industry. Without the technology created by IBM, the CRS would never have evolved. Later, the evolution of Orbitz and on-line travel agencies would never have occurred without the evolution of the Internet in the broader technology and business worlds, and its wide acceptance and usage by the public. This chapter will also report on the actions of Agents, Congress, regulators, and other federal agencies as the CRS evolves from a technical solution to a radical innovation that provides its innovators with above industry rents and follow-on innovations.

1950 - 1975: Inception and Development

The airline industry was regulated from 1936 to 1978. Every action — price, schedule, entry and exit into markets, employee relations and certifications, airplanes, and profits — required the Civil Aviation Board's (CAB) approval. This level of strict regulation continued until passage of the Airline Deregulation Act of 1978, when the industry was partially deregulated. The first CRS was invented during the regulated era, when government agencies,

universities, and corporations first started working with IBM on the original mainframes that could manage the millions of “bits” of data that organizations generated. The innovation was created to address the crisis of too many tickets to process and track manually on index cards and blackboards (Hopper, 1990; Watkins, 1973).

As discussed later in this chapter, Agents issued approximately 50% of all domestic airline tickets pre-Deregulation relying heavily on the Airline Tariff Publishing Co.’s Guide (Guide) to determine where airlines flew, schedules, and pricing. CAB had granted anti-trust immunity to the Guide’s publisher and airlines to provide information. In such a closed system, where all the decisions about routes, schedules, and pricing were determined in a public forum and published, everyone had equal access to the information. Decisions were made slowly and bureaucratically, with administrative appeal processes that could take decades. As ticket volume increased, this system became cumbersome, making a move to CRS increasingly attractive.

American, Delta, United, and TWA, the “Big Four” airline leaders, had sufficient financial resources to develop this expensive innovation. American began its efforts in 1959 with the Semi-Automatic Business Research Environment (Sabre) (Watkins, 1973) to track the “Passenger-Name-Record” (PNR) of ticket, price, itinerary, interlining tickets between airlines, etc. for each passenger.

Table 8
Computer Reservation Systems/Global Distribution Systems Names

Airline	Name of System and Successor Names
American	Sabre
Continental, Eastern, and Texas Air	MCS → SODA (from Eastern) → SystemOne → Amadeus, foreign owned
Delta	DATAS II → Worldspan
Northwest	Sperry Univac → ITT MAR-Plus → MAARS → TWA's PARS → Worldspan
Pan Am	Panamac
TWA	PARS → Worldspan
United	Apollo → Galileo

Data compiled by author.

Delta created the second industry CRS, DATAS II, followed by United's Apollo. The difference between Delta's CRS and those of American and United was that Delta was solely in the airline business while the latter two companies owned airlines, hotels (Americana Hotels and Westin Hotels, respectively), and freight services. This diversity allowed American and United to gain knowledge of the CRS needs in travel-related industries. Table 8 shows the evolution of key airline CRS, and later named Global Distribution Systems (GDS) names.

United, in particular, had a management team formerly from Westin Hotels, including its chairman and chief operating officer, Edward E. Carlson, and five board members serving both organizations (United Airlines, 1975). United

also had a contract with Westin Hotels to develop a computerized hotel reservations system. These diverse businesses allowed United to spread CRS development costs within and outside its organization and gain valuable knowledge.

Delta was stymied from developing a CRS that was as robust as those of American and United because it was under pressure from Agents to sell only airline tickets and not cross sell other services for example, auto rentals and hotel reservations. American and United could defend against such Agent complaints because they owned hotels. As a consequence, Delta's DATAS II system attained only 5% of market share of industry CRS revenues in 1989, or a distant fourth place.

TWA failed to take advantage of its resources in the 1960s and 1970s. Their first CRS efforts were aborted and only late in 1971 did it develop its Programmed Airline Reservation System (PARS) (Watkins, 1973). TWA continued to make poor CRS strategic choices when it decided against the use of a CRS in travel agencies and traffic departments of large corporations because the CRS failed to economically justify its continued development. TWA chose instead to invest in airplanes not information technology (Doty, 1973).

Eastern developed SODA, later named SystemOne. Texas Air, parent of Continental, later purchased the bankrupt Eastern and SystemOne became their CRS. Other airlines developed CRSs: Continental's MCS, Pan Am's Panamac, Northwest's Sperry Univac, ITT MAR-PLUS, and MAARS. Any airline could join another airline's CRS for a fee. However, some airlines were not charged fees,

particularly if they developed code-sharing or co-host status with American or United (Senate Subcommittee *Computer reservation systems*, 1985).

New Entrant airlines such as Southwest prided itself on its NCR cash register receipt tickets (Aviation Week & Space Technology, 1976b) and simplified computer systems (Southwest Airlines, 1978). Southwest's schedules were listed on Sabre but because of their simplified computers, reservations could not be made on that system (Senate Subcommittee *Computer reservation systems*, 1985).

In the 1960s and 1970s, most Majors cooperated with industry-wide CRS efforts. There was an expectation that the CRS would be an industry-wide solution and that individual airline CRSs were not the best technical and economic solutions (Aviation Week & Space Technology, 1973). Airlines instead spent their resources on other needs, such as new airplanes. Committees of the two industry trade groups, the Air Transport Association, of which most Majors were members and the International Air Transport Association, of which Delta, Pan Am, and TWA were also members, were created to cooperate and coordinate information automation systems such that they could be used worldwide. The first industry-wide CRS effort came about in 1967, the Donnelly Official Airline Reservation Systems. It failed financially. The second effort, Automated Travel Agency Reservation System, was ruled an antitrust violation (Aviation Week & Space Technology, 1973; Senate Subcommittee *Computer reservation systems*, 1985).

A third effort, the Joint Industry Computerized Reservation System, was granted antitrust immunity. However, at the end of 1975, United broke ranks with the industry, declaring that an industry CRS was too costly. The next day, United marketed its own CRS to Agents (Aviation Week & Space Technology, 1976a). American and TWA followed days later. It was a shock to the industry. Normally the Majors had worked as a group under regulation. The industry had organizations (e.g., Air Transport Association and International Air Transport Association), activities (e.g., Mutual Aid Package for strikes), and expectations (e.g., three industry efforts for an industry-wide CRS). But with deregulation looming, financial problems accumulating from the 1974–1975 recession, and the OPEC oil embargo, that unity unraveled.

1976 - 1983: The Rise of the Computer Reservation System

When United moved in 1976 to lease its CRS to Agents American and TWA quickly followed. American favored an industry-wide effort (Senate Subcommittee *Computer reservation systems*, 1985; Doty, 1973), but entered the business because of United's challenge. TWA marketed PARS in an effort to keep American and United from dominating the ticket distribution system (Senate Subcommittee *Computer reservation systems*, 1985). By 1978, American and United had control of 75% of the CRS market (Borenstein, 1992b). By 1979, American had installed its 1,000th CRS and United its 750th (Feazel, 1979).

The rapid spread of the CRS and dominance by two airlines was fostered by a series of crises. I will explore each in more detail:

Crisis: Too Much Information

Deregulation produced a proliferation of prices and schedule changes; the Guide was often out of date before it reached Agents (Aviation Week & Space Technology, 1980a). Pre-Deregulation, there were 400,000 airfares. By 1985, there were seven million airfares in Sabre alone (Senate Subcommittee *Computer reservation systems*, 1985). The ability of existing infrastructure to handle reservations and ticketing was strained.

Airlines, sensing regulatory reform in 1976, experimented with discount fares in an effort to prove the industry could voluntarily reduce fares. This only increased the number and types of fares available. American began Super Saver fares (American Airlines, 1977), Texas International introduced restricted discount fares (Congressional Budget Office 1988), and Delta started Night Owl fares (Delta 1976). Reservation centers could not handle call volumes produced by forty-nine and ninety-nine cent fares to inaugurate new service (Delta Aviation Week & Space Technology, 1979h; 1976, 1978; Standard & Poor's, 1982b).

Agents either had to call airline reservations centers, often overwhelmed when promotions were offered, or rely on a CRS to book tickets. Agents were only paid when they booked tickets, therefore they sought to increase their volume to increase their income. Also, Agents wanted to provide their customers with promotion tickets, again to increase their volume. Overall, the economic incentive for an Agent to use American or United's CRS was great.

Crisis: Antitrust Issues

In 1978, CAB began investigations into airline price fixing. It withdrew the Guide's antitrust immunity in 1979, eliminating a vital information resource. Without an alternative to obtain airline schedules, prices, and flights, even small agencies were forced to use a CRS. This crisis caused Agents to choose American and United, who controlled 75% of the market and had the resources to support a CRS long term. Large travel agencies like American Express used American and United's CRSs equally in their travel offices (Feazel, 1979).

CAB's antitrust concerns over international collective commission agreements spread to domestic agreements, which were voided in 1980 (Ott, 1980). Collective commission agreements determined all commissions between airlines and Agents and thus were deemed anti-competitive. CAB believed marketplace forces were more appropriate in the sale and marketing of tickets and fit the deregulated environment (Ott, 1980). The information link between airlines and Agents was severed and Agents were forced to choose a CRS.

American and United created commission agreements with Travel Agent Commission Overrides (TACO's), verified on a CRS. A TACO is an extra commission given to an Agent for giving an airline more passenger bookings. For example, an Agent normally books \$25,000/month on United. United watches the Agent's bookings on their CRS and sees that they are also giving \$10,000 to Continental. United could call the Agent and offer them their normal commission of 10% plus a TACO bonus of 5% on everything over \$25,000 if they make \$30,000/month of passenger bookings on United. Soon, Continental would see a

significant drop in passengers and the Agent would earn extra money. The more an Agent tickets, the more commission is earned. Importantly, this is all unknown to the passenger. Other airlines copied American and United. However, there was concern that negotiated agreements would prevent Agents from doing business with some airlines. Roger Chase, TWA staff vice president for agency and travel industry marketing, put it this way:

One of the things that has caused us to have a few goose bumps lately has been the expression of some industry leaders that perhaps with deregulation of the airline-agency relationship, the present system of some 15,000-odd agencies representing our industry might yield to a system of selective appointments. And selection might be based on an agreement with an agent not to represent your hated competitor (quoted in Griffiths, 1979, p. 36).

Crisis: First Mover Advantages for American and United

Industry followers had not anticipated the collapse of the third industry-wide CRS solution. Airlines were hard pressed to catch up to American and United's considerable CRS technological lead. As American and United continued their dominance of the CRS market, and therefore, access to Agents, key cities came under airline control. (See more on Hub and Spoke in Section 3.) For example, American, with a Dallas hub, ensured its CRS was available to most Dallas Agents. United, with a Chicago hub, ensured its CRS was used by most Chicago Agents. Typically, an Agent would only have one CRS because each was expensive to access and the agreement with an airline was often exclusive and required monthly fees. Also, additional CRSs would have required more space, supplies, training for staff, and technical updates. DOJ's (Senate Subcommittee *Computer reservation systems*, 1985) early 1980s CRS

investigation found that a dominant airline in a city became the dominant CRS vendor in that city since Agents wanted the best and most convenient access to information about the airline they used the most. The relationship between the dominant airline and CRS was synergistic and reinforcing. Thus, Agents selected American or United's CRS, unless they were in a hub city of another airline (e.g., TWA in St. Louis, Delta in Atlanta). A fourth industry-wide CRS effort by the American Society of Travel Agents was struck down on antitrust grounds (Senate Subcommittee *Computer reservation systems*, 1985; Feazel, 1979). The race for CRS dominance was over by 1978, two years after it began. Catch up by other airlines, with limited resources, was almost impossible.

Finally, with Deregulation came deep price discounting to fight New Entrants as airlines fought for market share (Standard & Poor's, 1982b). Against this backdrop, CRS owners realized a competitive and strategic advantage through the control and management of key information. In a matter of just a few years, the CRS became the central information hub of the airline and travel industry.

Playing Catch-Up

The rise of Southwest represented one of Deregulation's most significant New Entrants. Southwest began with NCR cash register tickets, and was proud of its simple computers (Aviation Week & Space Technology, 1976b). However, when price wars broke out between Braniff International (Braniff) and Texas International, Southwest could not protect its markets. It could not respond quickly to competitors' price and schedule changes (Aviation Week & Space

Technology, 1980c). In 1980, Southwest estimated it cost \$100,000/year to not fully utilize a CRS nor interline¹ with other airlines (Aviation Week & Space Technology, 1980i). Ticket sales were manually reconciled. Southwest developed Ticknet to sell tickets through Agents, by offering Agents a 10% discount on tickets. Agents, however, felt Southwest's charge for pre-paid ticket stock was an effort to shift cost to them (Aviation Week & Space Technology, 1980i). There wasn't much profit in tickets averaging \$34.

Southwest and Eastern also tried "Fasticket," developed by PSA. The "Fasticket machine" "...allows passengers to bypass airline ticket agents by inserting any one of six major credit cards, punching in a destination and whether it is one-way or round trip, and receiving a ticket in 15 seconds" (Feazel, 1979, p. 29). However, bypassing Agents was risky. Like Majors, Southwest was increasingly using Agents to sell tickets (19% in 1980, 25% in 1982, and 33% in 1983) (Aviation Week & Space Technology, 1980i; Southwest Airlines, 1983). With increased Agent sales, Southwest was forced to recognize the cost of transactions on other airlines' CRSs by including those cost with commissions in its financial reporting (Southwest Airlines, 1985). Although Southwest was listed on American's Sabre (though not initially charged fees by American) an Agent was unable to make a reservation for Southwest because of Southwest's simplified computer systems. They had to call Southwest directly (Senate Subcommittee *Computer reservation systems*, 1985). Southwest's costs were increasing because of its simplified computer systems.

Crisis: Industry Financial Troubles

Management attention was elsewhere. Airlines were to retire noisy, older aircraft at a cost of \$30 - 40 billion and a major recession was looming. Airlines faced fuel shortages and price increases (OPEC's oil embargo and fuel price decontrol in 1979). Some routes lacked fuel, particularly in the western US and the Pacific.

The industry experienced a series of financial crises that restricted resources starting with OPEC's oil embargos and fuel shortages, the 1974 - 1975 and 1980 - 1982 recessions, price and wage controls, and stagflation from 1973 - 1983, as described in Chapter 2. The industry needed \$30 - 40 billion to replace a fuel-inefficient fleet as well as meet FAA mandated jet-noise standards by 1985 (American Airlines, 1977). Financial stress varied by company, with Eastern, Pan Am, and TWA in poor condition following the 1974 - 1975 recession (Standard & Poor's, 1976). Table 9 shows debt to capital ratios in 1978, as defined in Chapter 2, where lower ratios equaled better access to capital. In general, access to external resources was constrained by high debt ratios, reluctance of lenders to provide credit due to deregulation uncertainty, and limited access to capital markets. The airline industry lost \$1.53 billion from 1979 to 1982, causing airlines to sell assets to manage through the financial constraints, including American's hotels (American Airlines, 1979). Other airlines cut costs or went bankrupt (i.e., Braniff and Continental).

Table 9
Select Airlines' Debt to Capital Ratios – 1978

Company	Debt to capital ratio
Northwest	< 13%
Delta	13.2%
United	42.3%
Continental	42.5%
American	50.1%
Southwest	54.2%
Texas Air	72.6%
Industry Average	51%

Note: Continental was purchased by Texas Air in 1982. Data from *Standard & Poor's Industry Analysis*, Standard & Poor's (1979a), New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission.)

Crisis: Increased Competition and New Entrants

Deregulation brought New Entrants (e.g., Midway Airlines, Muse Air (Muse), People Express (People), and Southwest) to compete, often at severely discounted prices. Incumbents began to compete in each other's geographic areas, reducing revenues.

Crisis: The 1979 DC-10 Grounding

The 1979 DC-10 grounding eliminated 12% of US passenger and cargo service, reducing revenues. It forced a scramble for alternative

airplanes and pilots, route realignment, and capacity reduction, or for Continental, stoppage of all Pacific routes. This affected companies differently: American lost 30 aircraft, United lost 37 aircraft (22% of capacity), and all of Continental's Pacific routes ceased (Aviation Week & Space Technology, 1979d).

Crisis: The Air Traffic Controller's Strike of 1981 - 1982

The air traffic controllers' strike (PATCO strike) of 1981 - 1982 required a 25% flight cutback at major hubs (Standard & Poor's, 1981a), which significantly reduced revenues.

Aftermath

The post-deregulation environment became reliant on speed, access to information (competitors and their own), and the ability to react to competition in real time. United made price and schedule changes in 20 minutes instead of 40 hours (Aviation Week & Space Technology, 1980k). The CRS became a database that allowed airlines to "signal" price and schedule changes and entry and exit into and from key markets to competitors (see a more detailed discussion in Section 3). Speed and real-time information became a strategic advantage. Airlines could decrease prices, increase volumes, and ultimately increase yields. Yield management software managed complicated calculations of prices and tickets. If flights were booking slower than historical patterns, or competitors cutting prices, a CRS could quickly recalculate fares in response to the changing environment. It became the key information link between airline and Agent, but not without bias — an airline's own data was highlighted more

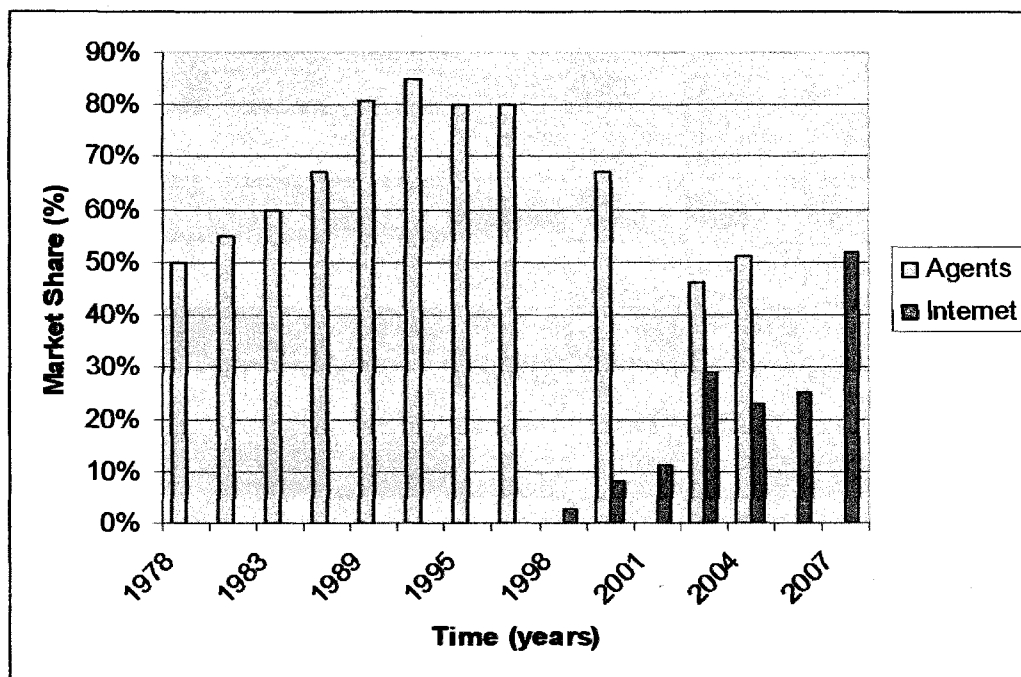
favorably than their competitors and halo effects — Agents looked favorably upon the airline that provided the most income and were more comfortable with familiar technology.

The post-Deregulation environment produced an opportunity for American and United to strategically use their CRSs and create follow-on innovations. Not only did the CRS allow American and United to manage their environment in the post-Deregulation turbulence, but it became the information hub for the entire travel industry and provided the industry with an anchor. In response to CRS and other global changes, the airline industry continued to see other notable developments, such as the increasing value of Agents, the invention of Frequent Flyer Programs (FFP), unprecedented CRS benefits, new technological innovations, and increasing competition and mergers.

Crisis: Agent as Gatekeeper

A key post-Deregulation development was the role of Agents in ticket sales. While in 1978, 50% of tickets were sold by Agents (Borenstein, 1992b), by 1980 that percentage was 55% (Ott, 1980), rising to 60% at the end of 1982 (Standard & Poor's, 1982a), and 80% by the late 1980s (Borenstein, 1992b), as shown in Figure 11. Since most of the tickets were sold through Agents, Agents were gatekeepers to the ultimate customer, the passenger. Although airlines could issue tickets for lower costs at their city ticket offices in key cities and at their reservation call centers, they chose to retain Agents as an essential distribution channel. For instance TWA chose

Figure 11
Market Share of Ticket Distribution 1978 – 2006



Note: Data from "The Evolution of US Airline Competition," by S. Borenstein, 1992, *The Journal of Economic Perspectives*, 6, p. 51; *Standard & Poor's Industry Airlines Surveys*, by Standard & Poor's, various years, New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission); *Airline Competition: Industry Operating and Marketing Practices Limit Market Entry*, by US GAO (1990b), Washington, D.C.: US GPO, p. 13; *Airline Ticketing*, by US GAO (2003), Washington, D.C.: US GAO; *Commercial Aviation*, by U.S. GAO (2004), Washington, D.C.: US GPO, p. 8; and *Airline Deregulation*, by U.S. GAO (2006), Washington, D.C.: US GPO, p. 22-23.

to deemphasize city ticket offices, in part because of wanting to curry favor with Agents. Roger Chase, Staff Vice President for TWA's agency and travel industry marketing, said:

The mere fact that the agencies' share of revenues is up does not cause us pain. In our case, our costs of selling in our own city ticket offices are somewhat less than the cost of selling through ... agents, but we're quick to say that if we were to have as many ticket offices as necessary to take the place of fifteen thousand ... agents, our costs would rise (quoted in Griffiths, 1979, p. 34).

Chase goes on to say, "We need the ... agent, and one reason is the congestion in our airports. We just say that we want to maintain the conditions under which ... agents can be our primary distribution channel" (quoted in Griffiths, 1979, pp. 35-36). Making a similar point, John Zeeman, United's Vice President of Marketing, emphasizes the public relations and service function of city ticket offices over ticket sales. "It's important to have a definite presence on Fifth Avenue in New York or ... in Chicago. But that's not a question of competing with the travel agents." In fact, he said, "We have fewer city ticket offices in total than we have cities served. And in small cities, we rely much more heavily on the travel agent" (quoted in Griffiths, 1979, p. 36).

American also recognized Agents' value, and offered CRS training programs at its Learning Center, as well as workshops and seminars in popular destinations such as California, Arizona, and Mexico (American Airlines, 1976). Moreover, Sabre was expanded to include agency accounting support (American Airlines, 1979), payroll, and financial analyses (Senate Subcommittee *Computer reservation systems*, 1985) which further integrated Sabre into the Agents' business.

Crisis: Follow-On Innovations

The CRS led to a number of follow-on innovations. Examples include: screen biases; TACOs; control of hubs via management of Agents, passengers, and smaller airlines; yield management software that allowed companies to earn maximum profit per passenger and flight; direct access to customer information (e.g., seat preferences); frequent flier programs (FFPs), seat inventory control

including management of the passenger “No Show” problem, efficient flight plans, and fees from Agents, hotels, car rental companies, and other airlines.

Frequent Flier Programs (FFPs)

Access to passengers, without upsetting agency relationships, was critical for airlines. Airlines accessed information about their passengers' travel preferences, especially business travelers, and created brand loyalty programs such as FFPs. As a FFP member, the more a person flew on a particular airline, the more points were accumulated for free services. American created the FFP in 1981 from its Very Important Traveler Program (Watkins, 1973). Loyalty programs provided a way to reward frequent passengers with free flights, business and first class upgrades, access to first class waiting lounges, and access to services of affiliated companies (such as hotels, car rental companies, and other airlines). Business travelers, the most lucrative travelers, often selected airlines that provided points on their FFPs. FFPs are now ubiquitous throughout the business world, with programs throughout the travel-hospitality industry as well as other consumer-oriented business (e.g., grocery stores, credit card companies).

Inventory Control

With a perishable, seasonal, and cyclical product, the airlines used a CRS to control seat inventory. Prior to CRS, there was very poor inventory control. “No Show” passengers were reduced and airlines allowed preferred passengers and

Agents to book “overbooked” flights. Inventory control using a CRS-like system is now ubiquitous in the travel and entertainment industry, such as hotels, amusement parks, and car rental companies.

Hub Management

Finally, a CRS allows for better hub management in a few different ways (see the Hub and Spoke case study in Section 3). For example, a CRS can be used to funnel Agents with TACOs or to direct co-hosting of smaller airlines and code-sharing with other airlines (e.g., US Airways, earlier known as USAir, with United and Delta with Northwest). Discounted or free CRSs were offered as incentives to the smaller co-host airlines, until it was banned in 1984. Also, affiliate airlines (smaller airlines under contract or owned by a CRS owner such as American’s American Eagle) could more easily feed passengers through hubs and onto the CRS owner’s planes.

Other Innovations

Using CRS, fuel management was implemented along with flight plans, load plans, crew pairing and tracking (Senate Subcommittee *Computer reservation systems*, 1985). Sabre’s introduced Performance Data Computer Systems for cockpit displays and optimum engine settings (American Airlines, 1979), including flight stimulator training for pilots.

Crisis: Smaller CRSs and Mergers

During this period other smaller airlines joined CRSs: Texas International and Air Wisconsin joined American's Sabre, Air Florida and Air Hawaii joined Continental's MCS, and Hughes Airwest joined Northwest's MAARS. Alaska owned its own CRS, Alice, located at 11 Alaskan Agents' offices (Feazel, 1979). Later, as a result of mergers with Wein Air and Jet America and route expansions, Alaska became a Major.

1984 - 1991: Competition and Regulation

This era can be characterized by its regulatory oversight and the conflicts between dominant CRS owners, American and United, the government, and other airlines. CRS usage had become critical to all airlines because most ticketing was done by Agents and almost 90% of all Agent-generated reservations were made on a CRS (Standard & Poor's, 1986). As Republic's president Daniel May told the Senate Subcommittee "[I]f you want to be in the airline business, you have to sell seats through either Sabre or Apollo... In Republic's case, we would not have lasted more than 30 days without bookings on Sabre or Apollo" (Senate Subcommittee *Computer reservation systems*, 1985, pp. 29-30). In 1982, American and United controlled 79.4% of CRS market share (House Subcommittee *Airline computer reservation systems*, 1988) causing other airlines to complain of monopoly power. Continental had abandoned MCS for American's Sabre (Continental Airlines Inc., 1978) and Northwest's various CRS attempts (i.e., Sperry Univac, ITT MAR-Plus, and MAARS) had failed to gain any significant market share. After these failures, there were five CRSs in the

industry, American's Sabre, United's Apollo, TWA's PARS, Delta's DATAS II, and Eastern's SystemOne.

In 1984, CAB issued CRS rules to protect consumers and ensure fair competition among airlines (US GAO, 2003). DOJ concluded that CRSs did indeed exercise market power. Charles F. Rule, Deputy Assistant Attorney General, Antitrust Division of the DOJ, when addressing a Senate Subcommittee (*Computer reservation systems*, 1985) made seven points:

1. It was very expensive and time consuming to try and develop a successful CRS.
2. There were no other substitutes for a CRS in terms of convenient automated scheduling and booking.
3. Agents usually had an exclusive relationship with one CRS and that airline CRS owner, and because other airlines felt the need to be on the CRS that was used by most Agents in cities they served, individual CRS had a great deal of market power against other airlines.
4. Airlines and their CRSs developed a synergistic and reinforcing relationship with Agents in cities the airlines dominated.
5. Airlines with dominant CRSs used screen biases against other airlines in response to their competitive initiatives. (Screen position was critical for all airlines because 90% of flights were booked from the first screen (Senate Subcommittee *Computer reservation systems*, 1985)).

6. Airlines with dominant CRSs earned incremental revenues on additional bookings through screen biases that gave them an advantage over other airlines and other CRS vendors. CRSs provided additional revenues to airlines.

7. CRSs had market power, and that market power has been used to thwart competition to some extent and to limit entry by others into the CRS and airline markets.

The CAB's 1984 CRS rules were successful in:

1. Limiting CRS contracts with Agents to five years or less.
2. Prohibiting Agent exclusivity agreements.
3. Eliminating co-host discounted fees and differences in booking fees charged to different airlines (Standard & Poor's, 1986; US Congressional Budget Office, 1988; US GAO, 2003).

CAB's 1984 CRS rules attempted to, but did not necessarily succeed in:

1. Eliminating screen bias that favored one airline's flights over another's, buried competitor's flights many screens after the preferred airline's flights, or failed to include competitors' information; and
2. Making available marketing information and services such as boarding passes and seat selection to all airlines, if available to any airline.

Four months after the CRS rules were enacted, Senate Subcommittee hearings were held to review continued complaints of monopoly power. The

Congressional Budget Office (US Congressional Budget Office, 1988) and GAO found that the CRS rules "... only changed the nature of the complaints... [dominant CRSs] exercise ... [market power] by charging higher fees" (House Subcommittee *Airline computer reservation systems*, 1988, p. 31). In addition, airlines complained about "tricks" used by American and United (Senate Subcommittee *Computer reservation systems*, 1985):

1. While American and United eliminated screen bias in its primary screen, a secondary screen was available to Agents, which was biased in favor of the CRS owner and could be locked in place.
2. The CRS owner could obtain competitive information on a real-time basis while other airlines, who subscribed to the service for \$10,000 per month, would receive stale data only once a month.
3. The complete integration of the owner's CRS with its internal reservation system gave it advantages over competitors, including abilities to obtain instantaneous readouts of seat availability, immediate seat selection, and issuance of boarding passes.
4. Flights to secondary airports next to hub cities were buried under many screens or required special keying (e.g., flights from Dallas' Love Field (Love Field Airport) were not displayed in a check for Dallas flights; Dallas - Fort Worth International Airport (Dallas Airport) flights, hub for American, were called up instead).

5. There was an inability to check billings for accuracy. For example, Muse, a domestic airline, received billings for Mexico City - Tijuana though they never flew outside of the US.
6. Competitors' fare changes were delayed up to five days, which could cause competitors to lose fare wars.
7. Competing airlines suffered under the fear of being disconnected from a given CRS, as was the case when Southwest was threatened with being disconnected from Sabre.
8. Competitor's low fares were removed from a price-comparison screen.
9. CRS owners created "...highly useful displays of other airlines' data on computer display terminals without ever printing it out, thereby avoided the regulatory requirement to share the information" (Senate Subcommittee *Computer reservation systems*, 1985, p. 50).
10. Agents were being lured away from competitor's CRS by offers of cash, waived fees, increased TACOs, or absorbed telecom charges.

The most egregious claim against American and United was excessive rents. DOJ found that American and United were able to earn incremental revenues by steering Agents to their flights as well as by charging supracompetitive prices to non-CRS owning competitors. Standard & Poor's analyst T. Canning observed that data submitted to Congress in early 1985

revealed that these CRS systems were a substantial source of revenue and cash flow:

Reflecting the new fee schedule, American projected that in 1985 the revenue for Sabre would increase 89% to about \$338 million and net income would nearly triple to \$116 million, providing a net return on revenues of 34%. United estimated that revenue from its Apollo system would rise 66% to \$246 million in 1985, with net income projected to expand more than five fold to \$39 million (Standard & Poor's, 1986, p. A33).

Another claim against American and United was that the companies threatened to deny other airlines access to a CRS as noted below. Lamar Muse, president of Muse and former president of Southwest, reported on Southwest's CRS experience:

...every airline ... has to use Sabre and Apollo or be forthrightly ... disconnected Southwest received [CRS] ... free of charge from American... American advised Southwest that ... each ticket ... would cost Southwest one dollar. Southwest resisted this change and actually called their bluff in the belief that with American being in so much trouble with the CAB concerning their Sabre system they would not jerk their schedules and ticketing availability from the system... Southwest was advised that if they did not sign an agreement ... American would remove their schedules and ticketing abilities ... the immediate reduction in Southwest's business was so drastic that ... Southwest ... negotiate[d]... the final agreement to maintain their presence in Sabre at ... one dollar per transaction (Senate Subcommittee *Computer reservation systems*, 1985, p. 40).

American and United naturally defended themselves in Senate

Subcommittee hearings. American's President, Robert Crandall, said:

Some years ago we, American, and I personally sought support for an industry system, indeed sought that support from some of the very men you have heard testify here today. They declined to join us in the creation of an industry system... So those... who criticize Sabre are those who chose not to create that system. They now seek the rewards of our risk and investment, and I am certain it will come as no surprise to you that we do not share their point of view (Senate Subcommittee *Computer reservation systems*, 1985, p. 74).

After an investment of almost \$350 million, it has finally become a system that contributes to the operating profits... After long years of effort, significant losses, and substantial risk, we have succeeded in developing an important new service for the travel industry (Senate Subcommittee *Computer reservation systems*, 1985, p. 81).

American ... incurred heavy startup losses at a time when it could ill afford to do so. During those years, other carriers made different investment decisions – some investing in fuel efficient aircraft; some in ground facilities; some in the stock of other airlines; and some in building cash equity (Senate Subcommittee *Computer reservation systems*, 1985, p. 87).

United's chairman and chief executive officer, Richard J. Ferris, in a statement to the Senate Subcommittee, offered the following explanation,

When the industry was regulated and efforts to set up industry-wide systems failed, United and American took significant entrepreneurial risks. Both carriers made enormous investments in the individual computer reservation systems. They do so foreseeing consumer needs and anticipating demands of travel agents.

One of United's few advantages, heading into deregulation, was its computerized reservation system. It helped offset some important disadvantages and kept United competitive in a different arena. Some carriers have used their cost structures to establish competitive advantages; some have restructured, or even used bankruptcy to establish new cost structures, some rely on equipment or service differences. We restructured, reoriented our marketing thrust, and used our computerized reservation system to our advantage. What's wrong with that?" (Senate Subcommittee *Computer reservation systems*, 1985, pp. 97-98)

DOJ (Senate Subcommittee *Computer reservation systems*, 1985)

concluded that substantial resources of skilled programmers and time were needed to enter the CRS market, and there were very few programmers. Once you got skilled programmers, if even possible, critical first mover advantages were still hard to overcome, a point that was emphasized by the Senate Subcommittee testimony of Republic's president, Daniel May, who argued that,

The ability of a carrier to market a CRS is substantially related to the amount of service it offers in that area and on whether it gets there first... In the case of Republic, which is both a smaller and newer

carrier, the cost of paying travel agents to switch from Apollo or Sabre, assuming it to be possible at all, would be prohibitive. Another near insurmountable problem for Republic – indeed virtual certainty – that existing CRS vendors would not make their schedules and capacity available for display. This means that Republic would start with a system that was missing 55% to 60% of the airline service in the US (Senate Subcommittee *Computer reservation systems*, 1985, pp. 32-33).

The airlines that did not own CRS sought the following remedies from

Congress:

1. The Divestiture of CRSs from airline ownership;
2. a tightening of regulations including price controls; and/or
3. joint ownership by airlines with Agents where a CRS controlled more than 5% of sales (Senate Subcommittee *Computer reservation systems*, 1985).

However, DOJ and CAB chose to abide by the 1984 CRS rules and declined to provide the requested remedies. DOJ, in particular, did not want to undertake litigation against specific CRS owners, which they believed would be too costly and time consuming, and would not prevent other CRS owners from causing future antitrust violations. Furthermore, they were against divestiture, again finding it too litigious and time consuming. It was also feared that such action might inhibit innovation, particularly with regard to integrated efficiencies that existed in current systems. And, finally, they opposed price regulation on the principle of 'free markets' which had gained prominence under the Reagan Administration (Senate Subcommittee *Computer reservation systems*, 1985).

Government agencies then spent the following years reviewing and documenting CRSs and their effect on the industry. (See Appendix B for a partial

list of government reports pertaining to CRS). In 1985, the DOT inherited CAB's duties including the responsibility to enforce CRS rules, which were then scheduled to sunset in 1990.

In 1984 a group of smaller airlines, recognizing that the Congress was not going to offer them relief, filed suit against American and United for antitrust violations. A fifth industry-wide attempt was made to create a broader-based CRS in 1985 (Standard & Poor's, 1986). In 1987 TWA and Northwest joined efforts to develop PARS, which had about 18% of the market, after receiving DOT antitrust exemption (Aviation Week & Space Technology, 1987). This effort led to Worldspan, which was eventually joined by Delta after its failed merger attempt with American's CRS. In 1986 even Southwest was forced to add capacity to its reservation system so it could respond to ongoing fare wars (Southwest Airlines, 1986).

A 1988 hearing of the Subcommittee on Aviation, House Committee on Public Works and Transportation, rebuked DOT for not taking action against CRS owners' abuse of monopoly power. In response, DOT completed an extensive study of CRSs² but made no recommendations. Representative Norman Mineta, Chairman of the Subcommittee summarized DOT's regulatory activities as follows:

[W]e would have expected the [DOT]... to have acted on its own initiative to consider what regulation or legislative measures are needed to deal with the CRS problem. Unfortunately, the Department's basic attitude seems to be "don't rock the boat." The Department appears to be unwilling to take any action on CRSs without substantial prodding and adverse publicity. Since the ... [DOT] took jurisdiction over CRS issues in 1985, the Department has taken only three general regulatory actions on CRSs. [They]

jawboned CRS owners to limit or eliminate biased secondary screens, contractual rollover clauses, and algorithms relying on elapsed time (House Subcommittee *Airline computer reservation systems*, 1988, pp. 13-14).

Victor S. Rezendes, Associate Director, Resources, Community and Economic Development, GAO, stated his concerns in that hearing, "...the success of United and American in establishing profitable CRSs is due to the inherent advantages provided by the route structure awarded them by CAB" (House Subcommittee *Airline computer reservation systems*, 1988, p.23).

Complaints of anticompetitive behavior mounted from various quarters:

Congress, GAO, Congressional Budget Office, airlines, Agents, economists, and financial analysts. Concerns were focused on the excessive profits that American and United earned as incremental revenues from their dominant CRSs, "halo effects" from relationships between CRS owners and Agents, contract language that limited Agents' abilities to end contracts and switch CRSs, the CRS owner's ongoing ability to raise fees, and their potential to block new airlines and CRS entrants. DOT (House Subcommittee *Airline computer reservation systems*, 1988) estimated American's return on investment at 129.5% and United's at 108.9%. Their incremental revenues were estimated at 9-15% of total revenues. Additional revenues due to "halo effects were estimated at \$2-3 billion per year."

Still Robert L. Pettit, Associate Deputy Secretary, DOT (House Subcommittee *Airline computer reservation systems*, 1988), recommended "caution" because of the potential downsides of divestiture, price regulation, CRS industry-ownership, and other actions that might harm the dynamic CRS industry. The DOT also cited New Entrants into the airline industry who did not own CRS,

yet were still successful (e.g., Southwest, Midway Airlines, and America West Airlines (America West)).

Meanwhile, also in 1988, United sold 50% of Apollo to a group of foreign and domestic airlines, including US Airways, when it changed its strategy from a diversified international travel services company to an airline-only company (United Airlines, 1985). The airline sold all non-airline assets, restructured its debt, purchased airplanes, and capitalized on Pacific routes purchased from Pan Am (United Airlines, 1988). Northwest purchased a 50% interest in TWA's PARS and abandoned its CRS. Eastern's SystemOne was acquired by Texas Air, who began spending resources on its newly acquired CRS.

American continued to protest against any new CRS regulations and maintained that neither it nor United had earned the internal rates of return suggested by DOT (House Subcommittee *Airline computer reservation systems*, 1988). American claimed its rate of return was 19%, not 129.5%. American reasoned that competition in the CRS market was not about CRS, but was really competition between airlines in regional hub markets or where market share increased as a result of mergers.

American pointed out that airlines merged in efforts to acquire CRSs, regional areas in which they were dominant, and to pressure Agents to use their CRSs' For example, Texas Air acquired Eastern, its Southeast hubs, and CRS; Northwest acquired Republic, its hub in Memphis, and a 50% share of TWA's PARS; and Delta, acquired Western Airlines and its hub in Salt Lake City. American added, "Today each of these carriers is abusing its market power by

pressuring local travel agents to convert its CRS with naked threats that the agents will not be able to survive in the market place without using the CRS of the carrier dominating the regional market” (House Subcommittee *Airline computer reservation systems*, 1988, p. 151). Lastly, American argued to the House Subcommittee that Agents’ complaints about required minimum usages of CRS and liquidated damages in the event of an early contract cancellation were not the abuse of monopoly powers but standard business practices that limited uncertainty and ensured cost recovery (House Subcommittee *Airline computer reservation systems*, 1988).

GAO testified before the House Subcommittee (*Airline computer reservation systems*, 1988) and again reiterated three possible solutions to the CRS monopoly issue: price regulation, an industry-wide CRS, and divestiture. It had reservations about instituting any of them. The first two would require government intervention and could lead to a loss of rivalry and innovation. GAO was concerned that divestiture would increase overall industry costs and possibly increase market concentration with higher booking fees. It stated its position to the House Subcommittee on Aviation as follows:

Divestiture would probably lead to the development of separate internal reservation systems by the major CRS-owing airlines. The airlines that own CRSs do not maintain separate internal reservation systems; the CRS is their internal reservation system. If they were required to divest themselves of the CRS (and hence of their internal reservation system as well), they would probably feel forced to develop a new internal reservation system to replace the CRS... We believe it is unlikely than any major airline would tolerate the loss of control inherent in having its reservation system totally in the control of an outside firm (House Subcommittee *Airline computer reservation systems*, 1988, pp. 72-73).

In 1989, CRS market control was divided as such: American at 43%, United and a consortium of airlines at 32%, TWA and Northwest at 10%, Texas Air and its subsidiaries (Eastern, Continental) at 10%, and Delta at 5% (US GAO, 1990a). However, a closer look at individual hubs showed a high concentration of Agents with CRSs linked to the hub's dominant airline. For example, 91% of the Agents in the Dallas Fort Worth area, American's hub and headquarters, used Sabre; 76% of the Agents in Denver, United's hub, used Apollo; and 77% of the Agents in St. Louis, TWA's hub and headquarters, used PARS (US GAO, 1990a).

In an effort to bring about an industry-wide CRS, American and Delta proposed merging their CRSs, Sabre and Datas II, which had 43% and 5% of the market, respectively. However, DOJ, which took over merger responsibility from DOT in January 1989, rejected the merger saying it would result in "higher fares and poorer service for airline passengers" and that would have led to about half of the domestic market's reservations on one system (Dallos, 1989). American's chairman, Robert Crandall, decried the charges by Transportation Secretary Samuel K. Skinner that such a merger would have resulted in an adverse effect on competition in CRSs and the airline industry. Crandall said in a statement, "For several years, we have heard a great deal about single-airline ownership (of CRS) and the perceived market advantages enjoyed by the owning carriers. While we believe the concerns are specious, the proposed partnership would have satisfied them" (Dallos, 1989, p. 2). Such a merger would also have been contrary to one of three solutions proposed by the GAO (House Subcommittee

Airline computer reservation systems, 1988) to solve the CRS monopoly issue: industry-wide ownership.

Later, American, following the lead of United, proposed to sell part of its CRS to other airlines in the US and abroad. Delta eventually joined TWA and Northwest's CRS, SystemOne. Paul Karos, airline analyst with First Boston Corp. added, "It looks like a loud and clear message that the Administration is going to be tough on airline merger - related events where large market shares are involved" (Dallos, 1989, p. 2).

In 1989, another review of CRSs by DOJ made the following observation:

Airlines had little choice except to participate in each CRS ... each CRS constituted a separate market for air carriers because of the near-exclusive relationship with separate groups of travel agencies, and each is a monopolist with market power over carriers that want to sell tickets in areas where the CRS has a significant number of travel agencies. Thus, unless an airline was willing to forego access to those travel agencies and the consumers they served, it needed to participate in every CRS (US GAO, 2003, p. 9).

Over time, CRSs evolved into a global distribution system (GDS) by adding features: train, tour, and cruise reservations; airline services (e.g., software and information technology services for personnel, aircraft scheduling, and baggage handling); outsourced internal reservation systems for other airlines; international travel services (US GAO, 2003); re-routing of aircraft after storms; distribution of aircraft among airports (Hopper, 1990); and the use of yield management software throughout the business world (i.e., hotels, car rentals, and other seasonal and cyclical industries). Agents' control of ticket sales continued with 67% of all ticket sales in 1984 (Standard & Poor's, 1984), 81% in 1989 (US GAO, 1990b), and 85% in 1993 (Standard & Poor's, 1998) (see Figure 11). Approximately 95% of Agents used a CRS, of which 75% were estimated to

have received an incentive benefit (e.g., free tickets, VIP club memberships, overbooking privileges, and TACOs) (US GAO, 1990b).

Despite the fact that the government and American and United disputed the amount of CRS revenues earned, the income was significant. United sold half its ownership for \$500 million in 1988, with a pre-tax gain of \$393 million (United Airlines, 1988) and a DOT estimated book value of \$250 million (House Subcommittee *Airline computer reservation systems*, 1988). In 1986, GAO estimated the "halo effect" increased American's revenues by nearly 40% and United's by nearly 36% (House Subcommittee *Comments on "Airline competition enhancement act of 1992"*, 1992). In 1988, GAO estimated that \$300 million per year was transferred to both American and United from other airlines (House Subcommittee *Comments on "Airline competition enhancement act of 1992"*, 1992). As stated previously, the GAO and DOT estimated that American and United made between \$2-3 billion in incremental revenues due to their CRSs (US DOT, 1990). So significant was the impact of CRS that American changed its business strategy, stating that "We are no longer an airline company, it is an information management company" (Senate Subcommittee *Airline computer reservation systems*, 1987). Indeed, American began to make more from the information technology business than the airline business (Standard & Poor's, 1994).

During this time period, however, there were many bankruptcies (i.e., Pan Am, People, Eastern, Midway Airlines, Muse, and America West) and mergers. American merged with Air California and bought Eastern's Latin American routes

and TWA's London routes. TWA merged with Ozark Airlines. Texas Air merged with Eastern, People, Frontier Airlines, and Rocky Mountain. Southwest merged with Muse and Northwest with Republic. Delta merged with Western Airlines and bought Pan Am's European routes. US Airways merged with Piedmont Aviation and United bought Pan Am's Pacific, London, and Mexico City routes.

As the nation entered Gulf War I and the 1991 recession, the industry was ill equipped to manage constrained resources due to high debt ratios, leveraged buy outs, limited access to capital, over capacity, merger issues, and continued price wars. As discussed in Chapter 2, the resulting industry losses in 1990 - 1991 wiped out all cumulative profits earned in the entire US airline industry history (Standard & Poor's, 1992).

1992 - 2006: Divestiture and the Rise of the Internet

This era can be characterized by continued government oversight of the CRS until its complete divestiture by airlines, the rise of the Internet as a means to distribute information and tickets, and the creation of Orbitz.com.

The 1984 CRS rules were scheduled to sunset in 1990. DOT issued a proposed set of rules in 1991, but the final rules were not enacted until 1992 (House Subcommittee *Comments on "Airline competition enhancement act of 1992"*, 1992). The new CRS rules incorporated the existing CRS rules and added an Agent's ability to use a personal computer to access all CRSs, a shorter contract period, and a "mandatory participation" rule that required airlines owning 5% or more interest in a CRS to participate in competing CRSs at the same level they participated on their own CRS.

Prior to the finalization of the 1992 CRS rules, GAO (House Subcommittee *Comments on "Airline competition enhancement act of 1992"*, 1992) reported that CRS biases continued as did the DOT's reluctance to move expeditiously to enforce the existing CRS rules. In particular, GAO was concerned about an "architectural bias" that could add to CRS owners' incremental revenues. This architectural bias was created by the way that a given CRS programming treated "hosts" and participating airlines. Hosts were those airlines that owned a CRS and used it as their own internal systems. Participating airlines were those airlines that paid for using other airlines' CRSs.

In earlier 1985 Senate Subcommittee hearings, 1992 House Subcommittee hearings, and a 1992 US GAO report, participating airlines complained of CRS owners' competitive advantages due to their complete integration with their internal reservation system. These competitive advantages were:

1. Owners could obtain information instantaneously (Senate Subcommittee *Computer reservation systems*, 1985);
2. Owners had control of seat inventory (Senate Subcommittee *Computer reservation systems*, 1985);
3. Owners had immediate seat selection and issuance of boarding passes (Senate Subcommittee *Computer reservation systems*, 1985);
4. Owners could continually monitor competitors' information (Senate Subcommittee *Computer reservation systems*, 1985);

5. Integration gave Agents a feeling of confidence in booking a flight on the owners' CRS because of an enhanced ability to handle complex itineraries, make changes easily, and access technical support (House Subcommittee *Comments on "Airline competition enhancement act of 1992"*, 1992);
6. Owner's internal systems communicated directly with the CRS while a participating airline's reservation system used additional communication lines and software to link the two systems. The latter was subject to translation problems between the systems, weather conditions that affect communications, or lines that did not work properly, with delays ranging from several minutes to hours (US GAO, 1992);
7. Defaults favored the CRS host owner's airline if an Agent failed to select a particular airline (US GAO, 1992); and
8. Participating airlines' were reluctant to share proprietary FFP information about their most valued customers or passenger records making it more difficult for an Agent to provide FFP updates or confirm accuracy of tickets (US GAO, 1992).

However, not all CRS owners used the CRS as their internal systems. In fact, only American and United used this hosting capability. For instance, US Airways, a co-owner of Apollo, did not do so; Northwest, TWA, and Delta had hosting capabilities, but chose to delete this function in 1993 when they merged

CRSs; and Continental, Eastern, and Texas Air chose to develop SystemOne as hostless.

Although a participating airline could upgrade to "direct access" status level, which allowed Agents to gain more direct information to book seats, differences remained between hosts and "direct access" participating airlines. Participating airlines continued to complain that host CRS owners had a competitive advantage that should be eliminated in the next round of CRS rules, despite the fact that they chose to eliminate this function in their own CRSs or did not use this function when available. Consequently, GAO (1992) recommended "dehosting," that is, separating the CRS owner's internal reservation system. This recommendation was contrary to GAO's earlier cost concerns associated with maintaining separate systems for CRS owners (*House Subcommittee Airline computer reservation systems*, 1988).

In response to these allegations, American developed a "seamless connectivity" product for implementation in 1993, which it believed would resolve differences between host and participating airlines. United's Apollo (along with US Airways, British Airways, Swissair, Alitalia, KLM Royal Dutch Airlines, and Air Canada) merged in 1992 with Galileo, a European CRS. United, too, promised to remove differences between host and participating airlines.

The new sunset date for the revised 1992 CRS rules was December 31, 1997, which was later extended to March 31, 2000, and again extended to January 2004. Before each proposed rule change, new reports were issued by

DOT, GAO, and Congressional committees. (See Appendix B for a partial list of these reports).

The Rise of the Internet

Meanwhile, as in the rest of society, the Internet began to penetrate the airline industry. In 1994 ValuJet, a New Entrant, introduced electronic tickets (E-Tickets), where “tickets” were no longer printed on paper (Standard & Poor’s, 1997a). Southwest soon adopted this innovation and by 1996 all Majors issued E-Tickets (Standard & Poor’s, 1997a). By 2000, 75% of Southwest’s tickets were E-Tickets (Standard & Poor’s, 2000), while the rest of the industry was at 50%. By 2004, approximately 92% of tickets were E-Tickets (Standard & Poor’s, 2004a). Because E-Tickets are less expensive for airlines – United estimated it cost 50 cents per ticket (Standard & Poor’s, 2007) – Alaska began to charge for a traditional paper ticket in 1999 (Standard & Poor’s, 1999a). Majors soon followed, charging \$25 - \$50 for a paper ticket (Standard & Poor’s, 2003; US GAO, 2003).

The use of the Internet as a search engine for airline information and tickets followed the broader technological revolution. Alaska first sold tickets on its website in 1995 (Standard & Poor’s, 2000). Southwest, who had never been an active developer of CRSs, was bumped off three CRSs in 1994, so Agents could not obtain their price and flight data. Finding American’s CRS prices “excessive,” Southwest created its own website in 1996. Southwest calculated the cost of its tickets to be less than \$1.00 and expected the cost to fall to 50 cents for Internet bookings, \$10 for Agent bookings, and several dollars for Southwest employee bookings (Standard & Poor’s, 2000). In comparison,

Table 10
Ticketing Costs (\$ per ticket)

	Southwest	America West	Incumbents	
			1999	2002
Airline website	\$.50 < \$1.00	\$6.00	\$23.40	\$11.75
Airline employee	Several dollars	\$13.00		
Internet Agent		\$20.00	\$25.00	\$19.43
Traditional Agent	\$10	\$23.00	\$45.93	\$30.66
Data Source	(Standard & Poor's, 2000)	(Standard & Poor's, 1999a)	(US GAO, 2003)	

Note: From Standard & Poor's Airlines Industry Surveys, Standard & Poor's, 1999-2000, New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission) and Airline Ticketing, US GAO, 2003, Washington, DC: US GPO.

America West, another New Entrant, had significantly higher costs than Southwest, as shown in Table 10, and Incumbents even higher ticketing costs. In 1996, Southwest sold 20% of its tickets and earned 25% of its revenues on its website. America West and Alaska booked 12% and 14%, respectively, of their tickets on their websites but United only 4% and Continental just 3% (Standard & Poor's, 2000). By 2003 – 2006 Southwest received 70% of its revenues from its website, Continental 24%, American 17%, and New Entrant JetBlue 79%. Airline web sales as a percentage of all sales were Alaska at 39%, America West at 20%, and JetBlue at 75.4% (Standard & Poor's, 2004a, 2005, 2007).

The overall impact of the Internet on sales costs was significant. Majors' ticket sale costs in 1999 were \$45.93/ticket at an Agent, \$25 at an online agent, and \$23.40 at an airline's website (US GAO, 2003). While Agents did 85% of all bookings in 1993 (US GAO, 2003), Agents' earnings reached their zenith in 1997. In that year, Agents did 80% of all bookings (Standard & Poor's, 1997a), earning more than \$6.6 billion/year (10.5% of airline costs) (Standard & Poor's, 1999a). Previously, in 1995 Delta cut domestic commissions to \$50/round trip ticket, signaling the end of the Agents' earning power. American, Continental, Northwest, TWA, United, and US Airways followed (Standard & Poor's, 1995). United cut commissions from 10% to 8% of ticket value in 1997 (Standard & Poor's, 1998), which was quickly adopted by all other airlines except Southwest. In 1998 United cut international commissions to \$100/round trip ticket (Standard & Poor's, 1999a). By contrast, in 1998 Majors paid internet agencies a 5% commission, capped at \$10/ticket (US GAO, 1999c). By 2002 ticketing cost were \$30.66 at an Agent, \$19.43 at an online agent, and just \$11.75 at an airline website (US GAO, 2003) as shown in Table 10. In 2003 Delta eliminated all agent commissions, followed by Northwest, Continental, and United, with American becoming one of the last to follow. The Agent's role as gatekeeper between passengers and airlines was undermined by airline websites and Internet agencies such as Travelocity, owned by American's Sabre Holdings, priceline.com, cheaptickets.com, and Expedia, a subsidiary of Worldspan, owned by Delta, Northwest, and American³.

The advent of the Internet, the added functionality to airlines' CRSs of a direct supplier internet link, increased sophistication of consumers, and follow-on innovations, led to the ability of consumers to purchase airline tickets in multiple ways, including:

1. Traditional Agents, who now charge for their services;
2. Airline websites;
3. Airline "800" call centers;
4. Airline ticket counters at airport and ticketing offices in major cities;
5. Orbitz, originally owned by United, American, Continental, Delta, Northwest, and US Airways and now owned by Travelport;
6. Internet travel agencies such as Travelocity, priceline.com, cheaptickets.com, and Expedia; and
7. Alliances members such as Star Alliance (made up of United, Lufthansa, Air Canada, Air New Zealand, ANA, Asiana, Austrian Airlines Group, bmi, LOT Polish Airlines, SAS, Singapore Airlines, South African Airways, Spanair, Swiss, TAP, THAI Airways, US Airways, and Continental) (United Airlines, 2007); oneworld (made up of American, British Airways, Cathay Pacific, Finnair, Iberia, Japan Airlines, LAN Airlines, Malev Hungarian Airlines, Qantas Airways, and Royal Jordanian Airlines) (American Airlines, 2008) ; and Sky Team (made up of Aeroflot, AeroMexico, Air France, Aitalia, CSA Czech Airlines, Delta, KLM Royal Dutch Airlines, Korean Air, and Northwest) (Delta Air Lines, 2007).

Agents responded to this threat with a number of lawsuits:

1. *Pacific Travel International v. American* in 1994, for 24-hour payment for discounted tickets, docket # OST-49808;
2. *US Travel Agent Registry v. American, Delta, Continental, and United* in 1997, for unfair competition, docket # OST-1997-2908-1;
3. *US Travel Agent Registry v. Delta, United, American, and Continental* in 1998, for reductions in international commissions, docket #OST-1998-4776-1; and
4. The American Society of Travel Agents' request to the DOJ to take antitrust action against airlines for lowering online commissions (US GAO, 1999c).

Agent ticket sales slowly declined as shown in Figure 11 earlier in this chapter: 85% in 1993 (10.9% of industry costs); 80% in 1997 (10.5% of industry costs and \$6.6 billion); 67% in 1999 (\$5.2 billion); 51% in 2004; and 48% in 2007. Beginning in 2005 Agent costs declined to 1% of revenues of the ten largest Majors (\$1 billion) (Standard & Poor's, 1997b, 1998, 1999a, 2000, 2005, 2006, 2007; US BTS, 2007; US GAO, 2003). Commission costs are no longer significant to airlines and are not separately listed in annual reports or 10-Ks.

Orbitz

In 1999, United, Northwest, Continental, Delta, US Airways, and later American, joined forces to create an Internet agency they called Orbitz (Standard & Poor's, 2000). Orbitz was the Incumbents' response to Internet agencies such as Expedia, priceline.com, cheaptickets.com, and Travelocity, which were

increasingly gaining ticket distribution market share. It offered a significant competitive advantage over other CRS systems, namely a direct "supplier internet link" to airlines' internal reservation systems which ran independently of a CRS and was accessed directly by consumers and not through Agents. Orbitz's supplier internet link gave airlines an alternative to CRSs, their fees, and the problems previously described. The creation of Orbitz represented the first new entry into the CRS market since 1976 when CRS were first created (US GAO, 2003). Orbitz's adoption was swift both because of customer convenience and Incumbents' bargain fares. Charter members agreed to offer their lowest fares on Orbitz versus any other website, including their own, Expedia, Travelocity, or any Agent, Internet-based or traditional. Charter members also received significant reductions in booking and transaction fees. At the request of the American Society of Travel Agents, DOJ investigated Orbitz and concluded that Orbitz was not a monopoly, dropping its antitrust investigation in 2003 (Standard & Poor's, 2000, 2003).

Although Southwest was not an Orbitz member, it had its flights and prices listed without ticketing capability. However, in 2001 Southwest sued Orbitz and refused to supply flight and price information, stating that the "site falsely claimed to offer the lowest air fares and showed consumers routes that Southwest did not fly" (Bloomberg, 2001). Southwest was afraid that if its customers used Orbitz, Orbitz could gain competitive leverage because it was controlled by Southwest's major competitors and was not constrained by regulators. "We don't ever want to be dependent upon our competition to sell our product," said Gary C. Kelly,

Southwest's chief financial officer (New York Times, 2001a). Southwest was trying to regain access to traditional CRSs, WorldSpan and Galileo, on which Southwest had more control of its fare and flight information and had Agent relationships. Among low-cost New Entrants, AirTran Airways (AirTran) and ATA Airlines (ATA) participate in Orbitz, whereas neither Southwest nor JetBlue sold tickets on Orbitz, Expedia, or Travelocity (Standard & Poor's, 2005). Despite the fact that Southwest created a robust alternative to the CRS using the Internet, the on-going competition between Incumbents and New Entrants continued.

Other Crises and Divestiture

As discussed in Chapter 2, between 2001 and 2005, the combined crises of the 9/11 attacks, 2001 recession, Gulf War II, and high fuel prices caused the Majors cumulative losses of \$35.4 billion — that after government subsidies of \$21 billion. These crises led to the bankruptcies of five Majors (i.e., ATA, Delta, Northwest, United, and twice for US Airways) with American hovering on the brink. These airlines represented 61.6% of the 2005 air travel market (Standard & Poor's, 2005). Assets were sold to stave off bankruptcy or as part of the bankruptcy proceedings. Many of the airlines sold their CRSs. American sold Sabre on the public market, retaining 82.8% in 1996, and sold its last holdings to Texas Pacific Group, later named TPG Capital, and Silver Lake Partners for \$4.3 billion in 2006 (Sorkin & Edmonston, 2007). United made a public offering, with its consortium of foreign airlines, of Galileo in 1997, but retained 15.2%. In 2001, all control of Galileo was sold to Cendant Corp, and later sold to Travelport, a private company owned by Blackstone Group (Sorkin & Edmonston, 2007).

Worldspan, owned by Northwest, Delta, and American was sold in 2003 to Travelport for \$1.4 billion (US GAO, 2003). Orbitz, owned by American, Continental, Delta, Northwest, US Airways, and United was sold to Cendant in 2004 for \$1.25 billion, and subsequently sold to Travelport (Standard & Poor's, 2005). Amadeus, previously SystemOne, is still owned by Air France, Iberia, and Lufthansa and is considered a foreign CRS by the US government (US GAO, 2003).

Despite United's initial size and route advantage at the start of Deregulation, its CRS dominance dissipated over time. United sold 50% of its CRS, Apollo, to foreign airlines and US Airways in 1988, and in 1993 merged Apollo with Galileo, giving up control. Apollo had a market share of 33% in 1986. In 2003, Apollo/Galileo had 20% of domestic bookings compared to American's Sabre at 43% and Worldspan at 29% (US GAO, 2003). American always maintained a 40% or more CRS market share until it, too, sold its CRS in 2006.

As a consequence of the divestiture by all US airlines of their CRSs, Orbitz, and the wide range of availability of tickets by independent online sites, Agents, airlines, and web sites, DOT rescinded all CRS rules, effective July 30, 2004 (US DOT, 2003). Congress, DOT, GAO, and DOJ had long desired the divestiture of CRSs from airline companies, however it took a severe financial crisis to achieve what they could not. DOJ, in responding to DOT's Notice of Proposed Rulemaking Computer Reservation System Regulations of June 9, 2003, concluded:

DOJ found no evidence that existing regulations designed to erode that [monopoly] power had succeeded in the past or are likely to

improve the situation in the future... DOJ noted that while the CRS rules have been effective in eliminating discriminatory pricing (charging different fees to target specific airline competitors), it has not prevented GDSs from charging fees above competitive levels (US GAO, 2003, p. 34).

Divestiture still has problems, CRS owners could still charge supracompetitive fees and there is still market concentration. So despite the rescission of CRS rules, DOT retained "its statutory authority to pursue future regulatory or enforcement as necessary" (US DOT, 2003). With the removal of CRS from airline control, the consolidation predicted by GAO occurred. By 2003, Travelport controlled 49% of the CRS market with

Table 11
Computer Reservation Systems/Internet Agencies Ownership

CRS/GDS	Owner
Apollo → Galileo	United → Consortium of airlines led by United → Publicly Held 1997 (15.2% United) → Cendant, 2001 → Travelport, 2003
PARS → Worldspan and Expedia.com	TWA → TWA and Northwest, 1987 → Worldspan TWA, Northwest, & Delta, 1993 → American, Northwest and Delta, 2000 → Private Corporation, 2003 → Travelport, 2007
Sabre and Travelocity.com	American → Publicly Held, 1996 (87.8% American) → Texas Pacific and Silver Lake Partners, 2006
SODA → SystemOne → Amadeus	Eastern → Texas Air, 1986 → Continental Holdings, 1994 → Consortium of foreign airlines (Air France, Lufthansa, and Iberia)
Orbitz.com	Continental, Delta, Northwest, United and US Airways → + American → Cendant, 2004 → Travelport, 2006

Data compiled by author.

Galileo and Worldspan (inclusive of Expedia.com), and Orbitz, the next generation of CRS. Texas Pacific and Silver Lake Partners controlled Sabre (inclusive of Travelocity.com) with 43% of the market (US GAO, 2003) as well as an interest in Continental, US Airways, and America West. Amadeus, a foreign CRS, controls 8% of the market. Table 11 lists CRS ownership.

Conclusion

This historical review discussed crises within the airline industry and one of the innovations created in response to those crises — the Computer Reservation System (CRS). While the airline industry was deregulated on price, market entry and exit, and schedules, the government maintained significant oversight powers, which it used on many occasions to try to regulate CRSs. Because CRSs generated above industry rents and market barriers, antitrust issues were crucial in the evolution of the CRS, strategic responses, development of follow-on innovations, and the Internet as a subsequent radical innovation. Other airlines mimicked the CRS yet were unable to overcome the first mover advantages enjoyed by American and United. The subsequent competitive efforts by other airlines, both Incumbents and New Entrants, reveals the workings of the innovation cycle, strategic efforts to gain a key resource either thru merger or purchase, and efforts by many competitors to use the government to even the playing field. Given this historical review we can determine the role of innovation and crisis in the discussion between free market proponents and empty core theorists. Can a radical innovation such as the CRS

provide sufficient above industry rents to overcome the empty core? That is the key question that we will attempt to address in the next chapter.

Endnotes

1. Interlining is where passengers are transported on two or more airlines in some agreed upon sharing arrangement of costs and revenues.
2. See US Department of Transportation (1988) *Study of Airline Computer Reservation Systems*. Washington, D.C., US Department of Transportation (DOT-P-37-88-2).
3. American acquired an interest in Worldspan when it merged with TWA in 2000.

CHAPTER 5

IMPLICATIONS OF COMPUTER RESERVATION SYSTEMS EXPERIENCE

Chapter 4 traced the complex history of Deregulation and its relationship to innovation. It included an overview of the government's regulatory involvement, the overall financial restraints of the period, and an exploration of the eventual divestiture of airline computer reservation systems (CRSs) by their airline owners. Now, having the appropriate background, attention can be turned to understanding the cycle of innovation as a whole in the airline industry and its relationship to economic, regulatory, and competitive crises. The implications of the CRS experience for airlines will be reviewed with a focus on the tensions between free market and empty core perspectives. In particular, this chapter will address the question of whether or not innovation is a possible answer to the empty core problem.

The Cycle of Innovation

With the Airline Deregulation Act of 1978, marketplace competition was supposed to create incentives for companies to innovate. This would enable them to benefit from market opportunities opened to them when regulatory protections were removed, particularly with regard to price, schedule, and market entry and exit. The basic assumption of the Deregulation Act is that free competition would provoke innovation.

The history of CRS, as explored in Chapter 4, contains crises of all sorts — competitive, economic, regulatory, and civil — and therefore provides fertile

ground to explore the relationship between crisis and innovation. Two significant examples of crises and innovation are evident in this case. First, in the 1950s – 1970s, ticket volume increased beyond the existing manual reservation system's capacity. Responding to this pressing need, the CRS, a radical innovation pioneered by American and United, swiftly became the information hub of the travel industry. As a second example, in 1994, Southwest was excluded from three of the then existing CRSs. Agents were unable to get flight and price data or write tickets from these systems for Southwest flights. The Internet was becoming widely available by then and taking their cue from ValuJet and Alaska who had created electronic tickets (E-Tickets) and airline websites, Southwest implemented their own innovations and became an Internet leader. Subsequently, the Internet became the primary industry information hub.

By every measure, the CRS was a radical innovation. Benner and Tushman (2002) and Abernathy and Clark (1985) defined a radical innovation as an innovation that fundamentally changes the technological trajectory and is designed for new or emergent customers. Delta's CEO W. T. Beebe said that in the late 1950s when Delta considered the volume of passengers expected, "... there was no way the airline could handle it efficiently with then-existing manual methods of record keeping" (Watkins, 1973, p. 45). According to Max Hopper, the executive behind American's Sabre, the CRS effort began because "... in late 1950's [the] volume of reservations began to outrun capacity to handle them with index cards and blackboards" (Hopper, 1990, p. 120). In response to this crisis

CRSs changed the technological trajectory from a paper-based system to a computer-based system.

Radical innovations provide their creator with new and emergent customers via follow-on innovations. New CRS customers were hotels, car rental agencies, other airlines, and travel-related companies. Follow-on innovations that provided future technologies, products, and services (Rosenkopf & Nerkar, 2001; Trajtenberg, 1990) were (in no particular order):

1. access to customer information;
2. real-time access to information including that of your competitors;
3. seat inventory control;
4. customer enhancements such as immediate seat assignments and issuance of boarding passes;
5. reservation services for hotels, cars, cruises, and other travel industry needs;
6. screen biases, that favored one airline's information over another;
7. travel agent commission overrides (TACOs) that steered passengers to one airline;
8. control of airport hubs by management of Agents, passengers, and other airlines;
9. frequent flier programs (FFPs);
10. yield management software that maximized profit per passenger per flight;
11. efficient flight and load plans;

12. fuel management;
13. and crew pairing and tracking.

Haroff, Narin et al. (1999) defined radical innovations as providing a company with above industry rents, which was clearly the case for CRSs, at least initially. Government agencies (CAB, DOT, DOJ, and GAO) were all concerned about above industry rents generated by CRSs. GAO and DOT said American and United made between \$2 - \$3 billion in incremental revenues (US DOT, 1990). By 2003, despite years of effort, DOJ concluded that there was no evidence that existing regulations aimed at eroding the CRS monopoly power had been successful in the past or would likely succeed in the future (US GAO, 2003).

The CRS was a radical innovation because it changed the way companies utilized information as a competitive strategy, enabling them to process and use critical information on a real-time basis. Deregulation moved the industry from a closed environment to a dynamic and interactive one. Pre-Deregulation, there were 400,000 airfares, whereas by 1985, there were seven million airfares in Sabre alone (Senate Subcommittee *Computer reservation systems*, 1985). Managing information became critical to airlines' success. In fact, in 1987 American declared that it was no longer an airline company but an information management company (Senate Subcommittee *Computer reservation systems*, 1985).

Pfeffer and Salancik (1978) cited the strategic advantage of those who control critical information and issue key reports. CRS owners obtained

competitive information on a real-time basis while other airlines, who subscribed to the service at \$10,000 per month, received stale data once a month (Senate Subcommittee *Computer reservation systems*, 1985). The complete integration of the owner's CRS with its internal reservation system gave it such important advantages as instantaneous seat availability, immediate seat selection, and issuance of boarding passes. Participating airlines would often have delays or mistakes due to system architecture problems at the interface between two systems and communication lines (Senate Subcommittee *Computer reservation systems*, 1985; US GAO, 1992).

Clearly, then, in response to an industry information crisis, CRS was a radical innovation that fundamentally changed the technological trajectory, engaged new or emergent customers, provided follow-on innovations, and secured above industry rents, confirming Raider's (1998) findings that "constrained industries use research and development to break out of constrained positions to increase market share, open new markets, ... and improve quality or increase profit margins."

Similarly, in the 1990s, the move to the Internet as an airline information hub was also a radical innovation. In 1994 ValuJet created E-Tickets. In 1995 Alaska created the first airline website. So when Southwest experienced CRS access problems, following the pioneering efforts of ValueJet and Alaska, they turned to the Internet and soon became the leader in both E-Tickets and airline websites, issuing 75% of its tickets as E-Tickets in 2000, while the rest of the industry was at 50% (Standard & Poor's, 2000). Southwest generated 59% of its

revenues on its website versus Continental's 27%, American's 17% and JetBlue's¹ 73% (Standard & Poor's, 2004b). In particular, Southwest never had the close relationship with Agents that the original CRS owners did, so they had none of the costs (real and perceived) of disengaging from Agents. As a consequence of this innovative use of the Internet, airlines are now able to bypass Agents and directly access customers on websites which result in significant cost savings per ticket. Southwest now enjoys above industry rents. Follow-on innovations that provided future technologies, products, and services (Rosenkopf & Nerkar, 2001; Trajtenberg, 1990) included:

1. Internet-only travel agencies such as Travelocity and Expedia;
2. airline and Priceline auctions for last minute seats;
3. broadened customer services including, itinerary changes, special discounts, and FFP offers;
4. and an unprecedented level of public comparison shopping and information access.

In 1999, Internet-based Orbitz.com, the next generation of CRS technology, was created by a group of Incumbents in response to Internet agencies and increased CRS fees. Websites such as these allowed airlines, including Southwest, to reduce CRS fees and Agent commissions from 10.5% of airline costs in 1997 or \$6.6 billion (Standard & Poor's, 1997a) to 1% of revenues of the top ten airlines in 2005 (Standard & Poor's, 2006) or \$1 billion (US BTS, 2007).

Like CRS, Internet websites were a radical innovation that fundamentally changed the industry's technological trajectory, embraced new or emergent customers, and provided follow-on innovations, and above industry rents. This comports well with Raider's (1998) findings that firms that faced strong, oligopolistic buyers and suppliers had higher rates of innovation and research and development investments: when Southwest found itself shut out of the CRS market by excessive fees and the refusal of three CRS owners to provide service, they turned to innovative use of the Internet to stay competitive. The historical record of CRS supports a dynamic model linking crisis and innovation in what we might call "the innovation - regulation cycle," which is described in Chapter 2.

CRSs and the critical skills and knowledge to manage them, became a key resource (Penrose, 1959; Wernerfelt, 1984), critical to success in the industry. Key resources are those resources that are rare, valuable, have few substitutes, and are difficult to imitate (Barney, 1991). Only the government, universities, and large corporations, like the "Big Four" domestic airlines (American, Delta, TWA, and United), had resources to develop such systems. DOJ found CRSs were rare due to system sophistication, the lack of skilled programmers, and that "substantial resources and time were required to enter the CRS market" (Senate Subcommittee *Computer reservation systems*, 1985, p. 24). First mover advantages (M. B. Lieberman & Montgomery, 1988) allowed American and United to gain a 75% market share within three years of

introduction (Borenstein, 1992a), outdistancing the competition and creating an effective duopoly.

Republic Airline's (Republic) president, Daniel May, confirmed these barriers to entry and first mover advantages, describing them as a nearly insurmountable problem (Senate Subcommittee *Computer reservation systems*, 1985). Furthermore, CRSs had no substitutes; as DOJ put it, "...no other service effectively competed with CRS for automated scheduling and booking. There was simply no other service that was so convenient as CRS" (Senate Subcommittee *Computer reservation systems*, 1985, p. 15). CRSs were also difficult to imitate. Delta created the second CRS but lost its close follower advantages due to a lack of business diversity, a conservative business strategy, and Agents' pressures. TWA failed to take advantage of its size and resources with poor strategic and resource choices and capital constraints.

Rare, valuable, hard to imitate, and with few substitutes, CRS continued to be a key resource through the mid-1990s but began to lose its value with the rise of the Internet, independent online sites, Orbitz, and airline websites. Orbitz, an incremental innovation, was the first entry into the CRS market with a supplier link directly to airlines' internal reservation systems, bypassing CRSs (US GAO, 2003). Unlike the original CRSs, websites were a radical innovation but were not a key resource in that they were not rare, were easily imitated, and had a variety of substitutes.

Impediments to CRS Development

At this point we may ask, how is the development, diffusion, and dominance of American and United's CRSs best explained? Clearly, a successful CRS needed a focused strategy and heavy investment. American's president, Robert Crandall, stressed this point to Congress:

American ...incurred heavy startup losses at a time when it could ill afford to do so. During those years, other carriers made different investment decisions – some investing in fuel efficient aircraft; some in ground facilities; some in the stock of other airlines; and some in building cash equity (Senate Subcommittee *Computer reservation systems*, 1985, p. 87).

Crandall's "heavy start-up losses" refers to what economists call sunk costs and irreversible resource commitments to specific strategies (Ghemawat, 1991), lumpy resources (Pettus, 2001), and a fear of change, all of which will cause a disequilibrium in the market and threaten existing structures, markets, and positions of power (Henderson, 1993; Reinganum, 1983).

The industry already had high fixed, sunk costs such as airplanes and airport facilities. Airplane replacement costs of \$30 - 40 billion were needed to meet noise regulations in 1985, with a second round of replacements in 1999. Past patterns of airplane purchases haunted the industry, particularly an overly optimistic view of the future. Incumbents did not foresee, with their 1960s airplane orders, fuel costs, noise standards, and Deregulation, that past purchases would become sunk costs and irreversible resource commitments to pre-Deregulation strategies. New Entrants were not so burdened. New Entrants' equipment matched the deregulated environment and noise standards (Southwest Airlines, 1978). Besides airplanes, Incumbents invested in hubs (see

Section 3), airport real estate, company acquisitions, equity, and so on. These sunk costs, and resource and strategy commitments led most airlines not to invest in CRSs, while American and United did.

Airplanes and CRSs represented lumpy resources. Lumpy resources were not continuously consumed but represented large expenditures used periodically. These resources developed one way in the regulated environment and were hard to reorient in a deregulated environment. Resource conversion required some admission of management mistakes, explanation of strategy changes, book write-offs, losses, and stockholders and lenders' concerns.

Fear of change also can cause disequilibrium in the market and threaten existing structures, markets, and positions of power. This resulted in a number of behaviors in CRS' development and diffusion. For example:

1. Agents demanded that Delta not infringe on their hotel and car rental business and maintain market equilibrium. Delta created a less robust CRS that it eventually abandoned.
2. Once United marketed its CRS, American and TWA followed days later to maintain existing structures, markets, and positions of power.
3. Despite American and United CRS dominance, they acquiesced to Agents' powerful role as passenger gatekeepers. American and United, however, used the CRS to obtain Agents' loyalty to their CRS.

Mergers created disequilibrium. Airlines fought for CRS and Agent control since Agents controlled passengers. This was evident in the mid-1980s with mergers among non-dominant CRS airlines. For example, Texas Air acquired

Eastern and therefore its CRS. Northwest acquired Republic and with it a 50% share of TWA's CRS. Delta acquired Western Airlines and its Salt Lake City hub. All of these acquisitions disturbed the equilibrium of the industry.

Thus, we see the role sunk costs, irreversible resource commitments to specific strategies, lumpy resources, and fear of change all contributed to disequilibrium in the development of the market. They also played a key role in the diffusion and dominance of American and United's CRSs, except in regional markets, which were dominated by other CRS-owning airlines.

Contrary to these conclusions, the GAO and other airlines held the opinion that American and United's CRSs resulted from CAB-conferred route advantages. Victor S. Rezendes, Associate Director, Resources, Community and Economic Development, GAO, said, "We believe that the success of United and American in establishing profitable CRS's is due to the inherent advantages provided by the route structure awarded them by CAB" (House Subcommittee *Airline computer reservation systems*, 1988, p. 23). While other airlines can be dismissed as competitors' complaints, GAO's position requires comment.

1. The CRS race was over by 1978. This could provide evidence for the GAO's position if CAB could claim credit for every pre-Deregulation innovation. However, economic studies that are the basis of Deregulation cite government as a barrier to innovation. Evidence provided herein shows that CRS evolved in spite of CAB and as an unintended consequence of CAB's antitrust actions. From 1960 to 1987, the government actually hindered American and United's CRS development.

2. CAB-conferred route certificates weren't ideal. After Deregulation, CAB allowed any "fit, willing, and able" airline to fly anywhere. Majors, Nationals, Regionals, and New Entrants made major capital expenditures for route changes post-Deregulation: Continental spent \$20 million on a Denver hub (Continental Airlines Inc., 1980); Texas International and Continental created Houston hubs (Standard & Poor's, 1981a); American

Table 12
Select Incumbents' Market Share and Debt to Capital Ratios – 1978

Share of Domestic Passenger Miles	Share of Scheduled Capacity (available seat miles)	Debt to Capital Ratio
United 24%	United 23.1%	Northwest < 13%
American 15.3%	American 14.9%	National Airlines < 13%
Delta 13.7%	Delta 13.5%	Delta 13.2%
Eastern 12.6%	Eastern 12.1%	United 42.3%
TWA 10.7%	TWA 10.9%	Continental 42.5%
Western 5.8%	Western 5.5%	American 50.1%
Continental 5.1%	Continental 5.3%	Southwest 54.2%
		Texas Air 72.6%
		Industry Average 51%

Note: Not included were TWA's international passenger and available seat miles. Texas Air later became Continental's parent. The data from *Standard & Poor's Airlines Industry Surveys*, Standard & Poor's, 1979, New York: Standard & Poor's, pp. 70 & 82. Copyright by Standard & Poor's. Used by Permission.

moved its headquarters to Dallas and added Sunbelt routes (American Airlines, 1978); and Delta added routes to Frankfurt (Delta Air Lines, 1979). It is clear that money was being spent on new routes and hubs, leaving little money for CRSs. United had a route advantage at Deregulation but also restructured: creating a Denver hub, Sunbelt routes, and a failed attempt in Atlanta (Aviation Week & Space Technology, 1979a). Route advantages pre-Deregulation did not appear to provide United and American with sufficient advantages, as all airlines radically restructured their routes post-Deregulation (see Section 3). Despite United's route advantages, its CRS market share dissipated over time until it sold all of its CRS ownership in 2001.

3. American, Eastern, Delta, and TWA were close in passenger market share at the time of Deregulation, while United was clearly the leader. Table 12 shows 1978 passenger market shares and debt ratios. The domestic passenger miles percentage is the number of seat miles used (seats used) compared to the number of available seat miles (seats available). Hence, passenger market share via routes conferred by CAB did not appear to create an insurmountable advantage for United, as its CRS market share dissipated over time. While American was the second largest airline in passenger market share, it was not significantly larger than Delta and TWA, if TWA's international passenger miles are included. Despite a modest size advantage, American became the dominant CRS

owner through the entire post-Deregulation period until it, too, was forced to divest its CRS in 2006.

4. CRSs required significant resources post-Deregulation and competed with other needs (e.g., airplanes, routes, airport hubs, real estate, acquisitions). Airlines made different capital allocation decisions. Debt to capital ratios as indicated in Table 12 is defined in Chapter 3, with lower percentages equaling better capital access. In 1978 Delta, Northwest, and National Airlines had the lowest ratios, 11% - 13.2%, compared to an industry average of 51% (Standard & Poor's, 1979a). These ratios argue that American and United, at 50.1% and 42.3%, respectively, were not favored with superior capital access to fund CRSs, while Delta, Northwest, and National Airlines were. The latter chose to use their assets to fund non-CRS strategies. For example, Delta failed to develop a robust CRS because of its conservative business strategies (e.g., new European routes, 30th year of dividends, debt repayment, and conservative depreciation schedule) (Delta Air Lines, 1978, 1979; Standard & Poor's, 1976) and acquiescence to Agents. Delta used its resources to purchase Western Airlines in 1986. Northwest had no long-term debt in 1982 (Standard & Poor's, 1982a). It invested in several unsuccessful CRSs (i.e., Sperry Univac, ITT Mars-Plus, and MAARS) and purchased 50% of TWA's CRS in 1987 as well as Republic in 1986.
5. A company could make poor strategic decisions. TWA decided not to use its CRS in Agents and corporations' offices because it failed to

provide economic justification (Doty, 1973). Finally, TWA was in poor financial condition after the 1974 - 1975 recession and was capital constrained: the airline had to choose between planes and CRS.

Companies' strategies led to funding decisions on CRS, not inherent advantages provided by CAB-awarded route structures, as GAO suggested. The record does not support GAO's position. Rather, American funded its CRS, routes, and hubs. United's initial size advantage may have led to a CRS advantage but it dissipated over time. Other airlines, especially Delta were not competitive in this arena, having chosen to allocate its assets elsewhere and sustain other long-held strategies.

Factors in CRS Development, Diffusion, and Dominance

American and United's CRS development, diffusion, and dominance occurred within the context of the airline industry, key players, and regulatory oversight. A series of crises led to rapid CRS diffusion and American and United's dominance:

1. Deregulation produced a flurry of price and schedule changes and reservation centers could not handle volumes produced by 49 and 99 cent fares (Aviation Week & Space Technology, 1979h; Delta Air Lines, 1976, 1978; Standard & Poor's, 1982b) except with a CRS.
2. Anti-trust immunity was withdrawn on the Airline Tariff Publishing Company's Guide (Guide) in 1979. Agents could not get ticketing information except by calling reservation centers or using CRSs.

3. The Guide was out of date before it reached Agents (Aviation Week & Space Technology, 1980a).
4. CAB voided collective commission agreements between airlines and Agents in 1980 (Ott, 1980). Agent negotiated contracts were verified on a CRS. Agents selected a CRS linked to an airline they ticketed most and that maximized their income.
5. Airlines sought first mover advantages in signing Agents in key cities. For example, as early as 1976 American offered training programs and seminars at popular destinations (American Airlines, 1976).

Three of the five crises were caused by government actions. Deregulation led to a profusion of information and changes that existing systems could not handle. Antitrust decisions against the Guide and collective commission agreements eliminated whatever reluctance an Agent had to join a CRS. It was impossible to gather information and sell tickets the previous way. CRS contracts opened the door for airlines to tie Agents to their CRS using TACO's, screen bias, FFP's, "halo effects," free tickets, VIP club memberships, and overbooking privileges. Agents' monetary and non-monetary rewards rose significantly. Each antitrust proclamation caused more Agents to select a CRS and they tended to select the most dominant CRSs, American's Sabre and United's Apollo.

In an ironic twist, Agents gained monopoly power over hub cities and airlines. Agents were responsible for 85% of all ticketing in 1993. DOJ found that "... a dominant carrier in a city became the dominant [CRS] vendor because ... agents wanted to have the best and most convenient access to information about

the carrier it tickets the most..." (Senate Subcommittee *Computer reservation systems*, 1985, p. 15). Since a CRS had a near-exclusive relationship with groups of Agents (US GAO, 2003) other airlines had to access competitors' CRSs to access Agents and passengers in those hub cities. This CRS-Agent relationship led to fierce competition among airlines and their CRSs in key cities (see Section 3). This competition led to an industry consolidation around four CRSs: Sabre, Apollo/Galileo, PARS/Worldspan, and SystemOne/Amadeus.

The 1984 CRS rules was CAB's effort to reduce American and United's CRSs dominance (Standard & Poor's, 1986; US Congressional Budget Office, 1988; US GAO, 2003) by:

1. Eliminating screen bias that favored one airline's flights over another's, buried competitor's flights many screens after the preferred airline's flights, or failed to include competitors' information.
2. Making available marketing information and services such as boarding passes and seat selection to all airlines, if available to any airline.
3. Limiting CRS contracts with Agents to five years or less.
4. Prohibiting Agent exclusivity agreements.
5. Eliminating co-host discounted fees and differences in booking fees charged to different airlines.

As is common with barriers to innovation, American and United found ways around the barriers posed by the 1984 rules:

1. Creating secondary screens that provided bias information that favored the CRS owner and could be locked in place. Since the Agent profited by doing business on one airline and its CRS, many Agents opted for this feature. Congressional and competitors' complaints forced American and United to disable the secondary screen.
2. Competitors' CRS information updates lagged, sometimes as long as five days, and were particularly harmful during price wars.
3. Because CRSs were based on complicated programming, defaults, program architecture, and preferences, CRS bias remained.
4. Limiting Agent exclusive contracts to five years or less were offset by significant Agents' sunk costs, minimum use requirements, and liquidated damages in the event of an early contract cancellation.
5. Prohibiting exclusive Agent contracts did nothing to reduce American and United's CRS dominance. Agents in key cities had monopoly power, not CRS owners. All airlines had to sign up for competitors' CRSs if they wanted to have a marketing relationship with Agents and passengers in that key city.
6. Eliminating co-host status with small airlines was countered by United's creation of code sharing alliances with many airlines, including other Incumbents (see Section 3).

The 1984 CRS rules had the unintended consequences of emboldening American and United to charge higher fees, eliminate discounts to smaller co-host airlines, and charge Southwest for previously free services. As the GAO

found, the CRS rules "... only changed the nature of the complaints... [to now complaints of] higher fees" (House Subcommittee *Airline computer reservation systems*, 1988, p. 31). The diffusion of dominant CRSs; the small number of players; the lack of major CRS' incremental innovation (Orbitz, in 1999, was the first major incremental innovation since 1975); the high cost of CRS development and their follow-on innovations; other capital demands (e.g., airplanes, airports, hubs); and excessive antitrust enforcement were all factors in the development and diffusion of only four CRSs, of which Sabre and Apollo were dominant through the early 1990s, and only Sabre was controlled by one airline, American.

In addition to the government's role in the development, diffusion, and dominance of the CRS, stockholders and creditors played a powerful role. They represented the industry's ability to access capital markets. As previously discussed in Chapters 3 and 4 there was wide variation in debt to capital ratios among airlines and the use of capital to fund the CRS and other strategies. With Deregulation looming, traditional investors such as banks and insurance companies left the industry. The major losses of the 1980s and continuing high fuel prices and shortages led investment bankers to shun Incumbents' IPOs, but undertook numerous New Entrant offerings (e.g., Midway Airlines, Muse, New York Air, a subsidiary of Texas Air, and People (Standard & Poor's, 1981a)). Merger mania swept financial markets in the mid-1980s, including the airline industry, and capital markets supported this effort to reduce competition, improve revenues, increase consolidation, and purchase key resources, including CRSs.

However, the losses of the 1990s and 2000s made small and institutional investors flee long-term airline investments:

Airline stocks are among the most volatile shares on the market... Once profits are ... [large], investors normally move on, racing to lighten their airline holdings before the next downturn. In light of this volatility, many airline stocks have historically been viewed as trading vehicles (Standard & Poor's, 2006, p. 33).

American and United cashed out their CRS investments when they needed to raise capital in the late 1980s and mid 1990s, and avoid bankruptcy or exit bankruptcy in the 2000s. Financial analysts and government agencies commented on the current financial condition of the airline industry:

The weakened balance sheet will constrain carriers' ability to increase capital expenditures, add to their networks, or to survive another downturn... influences of recent financial deterioration are expected to play out over a long period (Standard & Poor's, 2003, p. 7).

These airlines have compensated by taking on additional debt, using all (or nearly all) of their assets as collateral and limiting future access to capital (US GAO, 2006, p. 11).

These capital constraints continue to this day as reflected in the lack of funding for CRS follow-on innovations to monitor disruptions and track airplanes that remain on the tarmac for hours (Bailey, 2007d). According to Monte E. Ford, American's Chief Information Officer, American and other airlines built state-of-the-art computer systems before 1990, when they still owned them. As American and other airlines were preparing for a big investment in computers, 9/11, the 2001 recession, and bankruptcies happened: "That changed our investment profile from innovation to survival," Mr. Ford said (Bailey, 2007d, p. C1).

CRSs are now in private investors' hands: Travelport with 49% of the market and Texas Pacific² and Silver Lake Partners with 43% of the market (see

Chapter 4) (US GAO, 2003). The radical innovation of CRS, although diminished by the Internet, continues to provide above industry rents, but not to the innovators, American and United, or the rest of the industry. What was once a source of revenue is now an expense to be borne by the industry and its players.

Institutional Complexity and Change

As described in Chapter 2, the George, Chattopadhyay et al. (2006) framework (GCSB Framework) integrates several different theories and approaches and provides a way to analyze environmental changes (i.e., crises) and organizational responses based on how decision makers view threats. The GCSB Framework also shows, through the use of a series of frames over time, the complexity of competitive and institutional responses to crises. The GCSB Framework is shown in Table 13 (repeated from Chapter 2) with the matrix divided between control of resources or control over the environment. As previously discussed in Chapter 2, control over the environment ultimately ensures an organization will have access to resources. The matrix is also divided between whether the decision maker perceives the resource or environment as one for a potential loss or gain. If decision makers are unsure how to categorize the crises, George, Chattopadhyay et al. (2006) suggest simultaneous responses, decoupled. Some simultaneous responses are substantive and others symbolic (Meyer & Rowan, 1977; Westphal & Zajac, 2001). The GCSB Framework has been modified to include whether the isomorphic or nonisomorphic response is a free market or empty core solution, and the type of innovation created (e.g., radical, incremental).

Table 13
Institutional Persistence and Change

	Potential Loss	Potential Gain
Control of Resources	(1) Nonisomorphic response	(2) Isomorphic response
Control of Environment	(3) Isomorphic response	(4) Nonisomorphic response

Note: From "Cognitive Underpinnings of Institutional Persistence and Change," by E. George, P. Chattopadhyay, S. Sitkin, and J. Barden, 2006, *Academy of Management Review*, 31, p. 349.

An analysis of CRS using the GCSB Framework is depicted in Table 14 for 1975 – 1985, the period covering the rise of the CRS and the beginning of government regulation of the CRS. CRS is a key resource and a radical innovation as previously described. In cell 1 of Table 14, United was led by a Chairman/CEO and five directors from Western International Hotels, later named Westin Hotels, industry outsiders, who saw CRS' value. United dropped out of the industry-wide CRS effort and marketed its CRS directly to Agents, seeing the CRS as an opportunity to gain resources (i.e., direct access to Agents who were passenger gatekeepers) by exhibiting a nonisomorphic response to the crisis created by too many tickets to process manually. If United continued with the industry-wide CRS efforts, it would lose its technological edge of its CRS, Apollo, and lose resources as the CRS' benefits diffused throughout the industry. CRS represents a vertical integration of information systems for United and American with CRS the information hub of the travel industry. CRS, as a radical innovation

Table 14
The Rise of the Computer Reservation System: 1975 – 1985

	Potential Loss	Potential Gain
Control of Resources	<i>(1) Nonisomorphic response:</i> Potential loss of revenues if industry-wide CRS is executed. United, led by industry outsiders, markets CRS to Agents.	<i>(2) Isomorphic response (mimetic):</i> Potential to gain resources and thwart competitive threat, American and TWA mimic United. Bandwagon: Continental, Delta, Eastern, and Northwest.
	Radical innovation; empty core solution	Empty core solution
Control of Environment	<i>(3) Isomorphic response (coercive):</i> Non-dominant and non-CRS owning airlines seek government control of American and United's CRSs.	<i>(4) Nonisomorphic response:</i> American and United create new templates: follow-on innovations, new business practices, and reframe antitrust debate.
	Empty core solution	Empty core and free market solutions

Note: From "Cognitive Underpinnings of Institutional Persistence and Change," by E. George, P. Chattopadhyay, S. Sitkin, and J. Barden, 2006, *Academy of Management Review*, 31, p. 349.

with many follow-on innovations, provided above industry rents for United and American and is an empty core solution.

Cell 2 shows competitors' isomorphic responses to United's marketing efforts to Agents. Mimetic behavior is a typical isomorphic response to crises and uncertainty, where followers mimic leaders (DiMaggio & Powell, 1983). American and TWA mimicked United's CRS marketing to Agents days later to prevent United from gaining a competitive edge and dominating the ticket distribution system (Senate Subcommittee *Computer reservation systems*, 1985). American

and TWA saw the potential to gain resources (i.e., Agents and passengers) by responding to United's threat. Other airlines followed United, American, and TWA in what Aldrich and Fiol (1994) call the bandwagon effect. Bandwagon effects were seen by Continental, Northwest, Eastern, and Delta: Continental joined American's CRS, Sabre, in lieu of its own CRS, MCS, even though Continental marketed MCS to other airlines; Northwest spent resources on many CRSs (e.g., Sperry Univac, ITT MAR-Plus, and MAARS) only to purchase 50% of TWA's CRS, PARS; Eastern though in poor financial condition, spent scarce resources on its CRS, SODA; and Delta continued to maintain its CRS, DATAS II. The diffusion of the CRS represents an empty core solution by providing vertical integration of information systems for airlines and control of resources critical to airlines, Agents, and competitors.

The airline industry's coercive isomorphic response to crises pre- and post-Deregulation was to request government intervention to prevent loss of control over their environment. Cell 3 shows non-CRS-dominant airlines (i.e., TWA and Continental) and non-CRS-owning airlines (i.e., Mesa Air, Muse, and Republic) seeking government intervention. CAB's response to airlines' complaints was the 1984 CRS rules. When American and United subsequently increased fees, airlines again complained to Congress (Senate Subcommittee *Computer reservation systems*, 1985) and sought divestiture of CRSs from airline ownership, tightening of regulations including price controls, and joint CRS ownership by airlines and Agents. In their petitions to the Senate Subcommittee (*Computer reservation systems*, 1985) airlines complained of excessive fees and

the control of their data by their competitors in unfair ways (e.g., screen bias, lags in updating data, lack of real-time data). The airlines wanted control of the environment in which they sold tickets to Agents and the 1984 CRS rules, which were supposed to control American and United, did not work to their satisfaction. Airlines continued to petition Congress, DOT, and DOJ for CRS relief (*Airline computer reservation systems*, 1987; House Subcommittee *Airline computer reservation systems*, 1988; Senate Subcommittee *Computer reservation systems*, 1985; Hansell, 2003). Cell 3 represents a request to re-regulate the industry through price controls and an industry-wide CRS controlled by airlines and Agents. These proposed government solutions, especially price controls, are all empty core solutions.

Cell 4 shows American and United's nonisomorphic responses to other airlines and government's complaints of monopoly power. Because CRS was a radical innovation, American and United were able to create ways to bypass the 1984 rules through follow-on innovations, as described in Chapter 4. More importantly, however, American used nonisomorphic responses to government antitrust charges by creating new templates for the deregulated environment. Newman (2000), investigating Eastern European organizations post-Communism, found organizations create new templates to gain legitimacy and some level of control over their environment. American's CEO, Robert Crandall, went to great lengths to explain to Congress why American and United deserved high returns as a business model and not an airline model (Senate Subcommittee *Computer reservation systems*, 1985). Crandall attempted to

reframe the antitrust debate from CRS to hub monopoly power, stating Delta, Northwest, and Texas Air are "... abusing its market power by pressuring ... agents to convert its CRS with naked threats that the agents will not be able to survive in the market place without using the CRS of the carrier dominating the regional market" (House Subcommittee *Airline computer reservation systems*, 1988, p. 151). American also tried to use the legitimacy of standard business practices to limit business uncertainty and ensure cost recovery to reframe Agents' contract complaints of minimum use and liquidated damages clauses (House Subcommittee *Airline computer reservation systems*, 1988).

Deregulation is about unfettering airlines from regulation, thus allowing them to take risks and earn rewards. It is also a move to replace regulatory logic with market logic (Lounsbury, 2002). The nonisomorphic responses by American and United to create new templates for the Deregulated environment was both an empty core solution by creating a diversified, vertically integrated airline industry and a free market solution by unfettering airlines from regulations with market place solutions.

Table 15 analyzes CRS from 1986 to 2002. In cell 1, Southwest's CRS access was restricted on three of four CRSs: United's Apollo and Continental's SystemOne disabled automated ticketing for Southwest on all its flights as they entered Southwest's markets and Delta's DATAS II downgraded Southwest's CRS status after Southwest entered Salt Lake Airport (Knorr & Arndt, 2005). American increased Southwest's Sabre fees to levels Southwest called "excessive." With no alternative ways to access Agents, Southwest agreed to the

Table 15
Competitive Responses to the Computer Reservation System: 1986 – 2002

	Potential Loss	Potential Gain
Control of Resources	<i>(1) Nonisomorphic response:</i> Potential loss of revenues when Southwest's CRS access restricted. Southwest adopts E-Tickets and website to bypass CRS.	<i>(2) Isomorphic response (coercive and mimetic):</i> Potential to gain CRS resources by purchase (Northwest) or merger (Delta and Texas Air).
	Radical innovation; empty core solution	Empty core and free market solutions
Control of Environment	<i>(3) Isomorphic response (coercive):</i> Southwest sues Orbitz to control environment in which it sells its products.	<i>(4) Nonisomorphic response:</i> Non-CRS-dominant airline alliance to create Orbitz, bypass CRS, and compete with internet agents.
	Neutral to empty core and free market views	Incremental innovation; empty core solution

Note: From "Cognitive Underpinnings of Institutional Persistence and Change," by E. George, P. Chattopadhyay, S. Sitkin, and J. Barden, 2006, *Academy of Management Review*, 31, p. 349.

cost (Senate Subcommittee *Computer reservation systems*, 1985). Agents were still passengergatekeepers, controlling over 80% of ticket distribution in the 1990s (see Chapter 4), and Southwest had to access Agents through CRSs. Organizations that face loss of resources are more likely to engage in risky actions (Kahneman & Tversky, 1979) or nonisomorphic responses. Threats to resources make organizations conduct broader searches for alternatives that extended beyond traditional boundaries (March & Simon, 1958; Ocasio, 1995). Southwest's experience with American kept Southwest continually on the lookout for CRS alternatives. Taking ValuJet's E-Ticket innovation and Alaska's website

innovation, Southwest created a robust website that allowed it to create an alternative to CRSs in 1996. This breakthrough radical innovation represents the innovation - regulation cycle where a competitive crisis forces a player to respond with another radical innovation. Southwest's robust website prevented the loss of resources when it was severely restricted in its CRS access. Southwest's website was quickly mimicked by all Incumbents and New Entrants. The website represents vertical integration of information systems, an empty core solution.

Cell 2 shows isomorphic responses (coercive and mimetic) by non-dominant or non-CRS-owning airlines (Delta, Northwest, and Texas Air) in their efforts to gain a CRS, a key resource. With robust CRSs and airline mergers, these airlines gained legitimacy with Agents, a coercive, isomorphic response, and were successful in signing Agents to their CRS in their hub cities. For example, Delta used its CRS to gain Agents in Salt Lake City after it merged with Western Airlines, who lacked a CRS (House Subcommittee *Airline computer reservation systems*, 1988). These airlines joined the CRS bandwagon, a mimetic, isomorphic response, to ensure they did not under perform the industry. All Majors, except Pan Am, told the government that it was critical to their business to own a CRS (House Subcommittee *Airline computer reservation systems*, 1988). Mergers are both free market and empty core solutions. The free market believes mergers should take place to eliminate weak competitors. Mergers are an empty core solution because it reduces excess capacity and raises revenues.

American and Delta proposed merging their CRSs, Sabre and DATAS II in 1988. Delta's CRS market share never exceeded 5% except in hub cities (e.g., Atlanta and Salt Lake City). DOJ rejected the merger because about half of the domestic market's reservations would be on one CRS (Dallos, 1989). Eventually, Delta merged its CRS with Northwest and TWA's PARS, which became Worldspan. CRS allowed for vertical integration, and purchases and mergers, reduced competition and raised revenues — all empty core solutions.

Cell 3 addresses Southwest's successful suit against Orbitz and its airline owners to retain control of the environment in which it sold its product. Southwest flights and fares were sometimes listed on Orbitz inaccurately and without its lowest fares (Bloomberg, 2001). "We don't ever want to be dependent upon our competition to sell our product," said Gary C. Kelly, Southwest's Chief Financial Officer (New York Times, 2001a, p. TR3). Orbitz was owned by Southwest's major competitors and was not constrained by regulators despite requests by the American Society of Travel Agents for DOJ antitrust investigations (Standard & Poor's, 2000, 2003). Southwest was born in litigation: prevented from flying for its initial four years and requiring a federal amendment (the Wright Amendment) to fly interstate by competitors' litigation (Southwest Airlines, 1976, 1980). Litigation was the industry's coercive isomorphic response to threats/crises. While Southwest was often the brunt of litigation, it used litigation when required as when it joined its former nemeses, the Cities of Dallas and Ft. Worth and the Dallas Ft. Worth Regional Airport Board to keep Texas International from flying out of its hub, Love Field Airport in Dallas (Southwest Airlines, 1980). The use of

courts is neither an empty core nor a free market solution. The courts can be used in antitrust litigation, administrative resolution, contract disagreements, and a myriad of other issues. The issue at stake may determine whether the response is an empty core or a free market solution but not the use of the courts. In the litigation against Orbitz, Southwest was seeking to regain control of its sales environment from a group of competitors, a competitive response which is neither an empty core nor free market solution.

Cell 4 refers to Continental, Delta, Northwest, United, and US Airs' alliance to create Orbitz initially in 1999. These airlines were non-dominant CRS airlines until American joined the alliance. Orbitz was the first significant incremental innovation since CRSs were created and withstood DOT and DOJ antitrust review and Agents' lawsuits. Orbitz was a nonisomorphic response to higher CRS fees charged by dominant CRSs, airlines relinquishing control over Agents as they reduced commissions, and the rise of Internet agencies (see Chapter 4). It was the only successful quasi-industry-wide CRS effort. Charter Orbitz members enjoyed lower fees and agreed to offer their lowest fares there, including their own websites and any Agent's, Internet-based or traditional. Orbitz provided vertical integration and alliance solutions to solve the empty core. Alliance members agreed to cooperate to increase market share, reduce costs, and increase revenues.

Vertical integration (cells 1, 2, and 4, Tables 14 and 15) allows a company to acquire more resources as American and United found. Mergers (cell 2, Table 15) reduce competition and allow remaining players to charge higher fees.

Alliances (cell 4, Table 15) allow players to coordinate their activities, reduce competition, reduce costs, and increase revenues. Calls for government intervention to divest American and United of their CRSs (cell 3, Table 14), price controls, and an industry-wide CRS all represent efforts to solve the empty core.

For free market proponents, cell 4 of Table 14 is American and United's effort to benefit from their radical innovation. American challenged the government's antitrust investigations with ideas of innovation and entrepreneurial risk and borrowed templates from the business world and applied them to the deregulated airline industry. Cell 2 of Table 15 is an example of government appropriately not intervening in airline mergers (e.g., Northwest and Republic; Texas Air and Eastern) and granting antitrust immunity for Northwest and TWA's CRS alliance. This is an example of the market working within the industry. However, contrary to free market views were later criticisms by DOJ and Congress of these mergers and DOJ's rejection of American's Sabre and Delta's DATAS II merger on antitrust grounds. Congress was particularly critical of the lack of effort by DOT to curb American and United's abuse of monopoly power conferred by their CRS, particularly DOT's "don't rock the boat" attitude (House Subcommittee *Airline computer reservation systems*, 1988). DOT, in defense of its caution, was concerned that divestiture, price regulation, CRS-industry ownership, and other actions might harm the dynamic CRS industry (House Subcommittee *Airline computer reservation systems*, 1988). DOT was in alignment with the free market view.

Tables 14 and 15 provide an analysis of two periods of CRS' development, diffusion, dominance, and displacement. They show the importance of industry outsiders (i.e., United's non-airline management) and population outliers (i.e., Southwest) to break out of isomorphic behaviors and respond with a radical innovation (cell 1, Tables 14 and 15). The perspectives of these two management teams were not committed to the actions, practices (Mezias, 1990; S. B. Sitkin & Sutcliffe, 1991; Zilber, 2002), structures (Fligstein, 1985), understandings, and ways of doing things that was typical for the industry. The industry's equilibrium was upset by American and United's CRS dominance, and as typical during periods of crises and great uncertainty, led to mimetic behavior by industry followers (cell 2, Tables 13 and 14). American and United's CRS dominance led to both isomorphic and nonisomorphic responses from competitors to gain a key resource, acquiring a CRS by purchase or merger (cell 2, Table 15), and regain control of the environment, through coercive, isomorphic government intervention (cell 3, Table 14). Tables 14 and 15 also clearly depict the innovation – regulation cycle with pleas for regulatory intervention. The radical innovation produces above industry rents for the innovator, which leads to a competitive crisis for other players in the industry. Competitors respond by:

- a. initiating innovative responses, often mimetic (cell 2, Tables 14 and 15); or
- b. responding with a radical innovation (cell 1, Table 15); or
- c. supporting regulatory intervention (cell 3, Table 14).

Airlines sought control of their environment by requesting government intervention (cell 3, Tables 14 and 15), a typical isomorphic response of the airline industry which continues today with the increased use of bankruptcy courts and government subsidies in the 2000s. American and United created new templates for the industry (cell 4, Tables 14 and 15) by the use of follow-on innovations from the CRS (e.g., alliances, new business practices) and attempts to reframe the antitrust debate. The migration of nonisomorphic responses to new industry templates to deal with changed environments are depicted in cell 1 of Table 14, which created the CRS as an industry standard, resulting in cell 2 of Tables 14 and 15. Speed of adoption of nonisomorphic templates depended on how great a threat other players perceived a radical innovation. American and TWA (cell 2, Table 14) responded within days of United's CRS marketing efforts to Agents while Northwest and Texas Air (cell 2, Table 15) took more than ten years to acquire a robust CRS. Southwest's website innovation (cell 1, Table 15) became an industry standard within months.

Finally, is there any relationship between the GCSB Framework and whether it produces a radical innovation, a free market solution, or an empty core solution? Based on the limited data presented in Tables 14 and 15, an innovator's potential loss of control over resources appears to lead to a radical innovation (cell 1, Tables 14 and 15). That is to say, when United and Southwest were faced with the potential loss of a key resource, they were forced to execute a nonisomorphic response that led to a radical innovation. All four cells of the GCSB Framework lead to empty core solutions, though cell 3 provides weaker

evidence (see cell 3 of Table 15, which is neutral to both empty core and free market views).

From a free market perspective, the potential to gain either resources or control of the environment appear to lead to free market solutions, though only in cell 4 of Table 14 and cell 2 of Table 15. The free market view supports the innovator's usage of an innovation to gain benefits, as American and United benefits from follow-on innovations and new business templates. The free market view also supports consolidations through mergers and acquisitions by allowing excess capacity and weaker competitors to be bought. These free market views focus on gains made by strong competitors.

In contrast, the empty core theory says that the industry is unable to reach equilibrium between costs and revenues because of high fixed costs, and an inability to decrease production during periods of low demand (e.g., recessions) and make a profit or cover costs. Solutions to the empty core problem include radical innovations that allow airlines to achieve above industry rents to cover losses during recessions or other crises (cell 1, Tables 14 and 15); contraction of the number of players in the industry to reduce over capacity issues and weak players (cell 2, Table 15); vertical integration that allows airlines to earn additional revenues to cover periods of losses (cells 1, 2, and 4, Tables 14 and 15); government intervention, particularly price controls (cell 3, Tables 14 and 15); and alliances that encourage cooperation among industry players to reduce costs and increase revenues (cell 4, Table 15). This analysis using the GCSB Framework is of a very small sample and will be compared to the findings of the

Hub and Spoke case study (Section 3) to confirm or refute these preliminary findings.

Strategy Issues

We have discussed and analyzed the CRS as a key resource (Barney, 1991; Penrose, 1959; Wernerfelt, 1984) which provided United and American with above industry rents, follow-on innovations, and the ability to control the CRS such that it posed a significant competitive barrier for the rest of the industry. DOJ "... found no evidence that existing regulations designed to erode that [monopoly] power had succeeded in the past or are even likely to improve the situation in the future" (US GAO, 2003, p. 34), confirming the CRS as an sustainable competitive advantage. However, competitors constrained by the radical innovation create new radical innovations to break out of those constraints (Raider, 1998) and continue the innovation – regulation cycle, as seen by Southwest's website.

We will now investigate the relationship of crisis and innovation and the nature of the crisis that may lead to radical innovations. Because radical innovations provide the innovator with monopoly-like powers, the government's role in monitoring antitrust activities is critical in the on-going discussion of free market versus empty core views and the resulting policy implications.

Crisis and Innovation

Radical innovations are the most critical innovations because, as stated earlier, they change the technological trajectory and are designed for new or

emergent customers, provide the innovator with above industry rents, and provide follow-on innovations with benefits for the future. If the innovator manages the radical innovation as a key resource (Penrose, 1959; Wernerfelt, 1984) and prevents or delays its diffusion into the industry, the innovator can build substantial barriers to entry. Of course, as with any key resource, the innovator must be constantly aware of the environmental changes or crises that could diminish the value of the key resource. The innovator is always on the cusp of maintaining control of his/her key resource, exploiting his/her resource, and knowing that his/her resource will be displaced by another radical innovation.

A proposition of this thesis is that crisis provokes innovation. As Raider (1998) found, innovation is greater among companies when the competitive environment is most severe, as for example in the uncertainty of the regulated era when traditional capital markets closed to airlines. United sought a competitive advantage in a new and uncertain environment, or as its chairman and chief executive officer, Richard J. Ferris said, "One of United's few advantages, heading into deregulation, was its computerized reservation system. It helped offset some important disadvantages and kept United competitive in a different arena" (Senate Subcommittee *Computer reservation systems*, 1985, pp. 97-98). Companies that face strong, oligopolistic buyers and suppliers have higher rates of innovation and R&D investment, as exemplified by Southwest in its constrained access to CRSs that threatened its livelihood. Raider (1998) also found that constrained industries use R&D to break out of constrained positions to increase market share, open new markets, and improve quality or increase

profit margins, as American and United did through the use of their CRS and its follow-on innovations to create new markets not only in the airline industry but in the larger business community and above industry rents. Finally, Raider (1998) found membership in large networks constrain innovation, as was the case in Delta's acquiescence to Agents to not create a robust CRS or in American's reluctance to cut Agent commissions because of its close association with Agents and its large CRS market share. Raider's (1998) findings are confirmed in this analysis.

While American managed its CRS as a key resource and created many follow-on innovations, it is noteworthy that American did not create a radical innovation, but was a close follower of United. United with an outsider management team, was the CRS leader. American followed United's lead to market its CRS days later. United and American were industry leaders and were one of the "Big Four" airline leaders at the time of CRS' creation. In contrast to United, American was led by an airline management team, most notably Robert Crandall, who rose within the ranks of American. American prided itself in speaking about airline industry issues in its annual reports' "Industry Insight" sections (e.g., against Deregulation and lack of capital access for industry (American Airlines, 1976) and the cost of meeting FAA noise requirements with new aircraft (American Airlines, 1977)). American also took a much more public role than United in defending its right to above industry rents as a result of its entrepreneurial risks and large investments in Sabre (Senate Subcommittee *Computer reservation systems*, 1985). United, with a 24% share of domestic

passenger miles, compared to American's second place 15.3% market share (Standard & Poor's, 1979a) appeared to not relish such a public role, although its chairman and chief executive officer, Richard J. Ferris, issued a statement to the Senate Subcommittee (*Computer reservation systems*, 1985) arguing that the CRS was a result of significant entrepreneurial risks that other airlines were unwilling to take. While American was forcefully arguing against further regulation of the CRS, United was diversifying into a travel-related company with interests in Westin Hotels, Hertz, and Hilton. American later attempted to change from an airline company to an information management company, much to the derision of Senator Howard Metzenbaum, chairman of the Senate Subcommittee on Antitrust, Monopolies, and Business Rights (*Airline computer reservation systems*, 1987).

American was clearly superior to United in managing the CRS as a key resource and maintaining a market share of 40% over its ownership period. American also created many more follow-on innovations than United, such as FFP, yield management software, and TACOs. Yet, United, having divested most of its interest in its CRS, was able to convince other non-dominant CRS owners (Continental, Delta, Northwest, and US Air) to form an alliance to create Orbitz, the only incremental innovation of the CRS. American did join Orbitz later, adding it to a broad interest in other CRSs (Sabre and Worldspan) and Internet travel agencies (Expedia and Travelocity). Thus, we see a close rivalry between United and American in the CRS' development, dominance, and diffusion.

The interplay of innovators, close followers, industry followers, and industry outsiders has been outlined as all players respond to the innovation – regulation cycle. Because calls for government intervention are part of the innovation – regulation cycle, innovation and regulation are analyzed in the following section and, in particular, antitrust actions.

Innovation and Regulation

One of the goals of Deregulation was to unleash innovation and use it and other incentives to reduce costs, not deemed possible in a highly regulated environment. Heavy regulatory adherence, in the words of CAB chairman Alfred Kahn, eliminated “a competitive or innovative step ... [and] run directly counter to the requirement of competition and risk-taking innovation” (Kahn, 1978, p. 35). The unsaid discussion of innovation by regulators contemplating deregulation was this: “Whom should innovation benefit?” This discussion on innovation beneficiaries will start in this chapter and continue through Chapter 11.

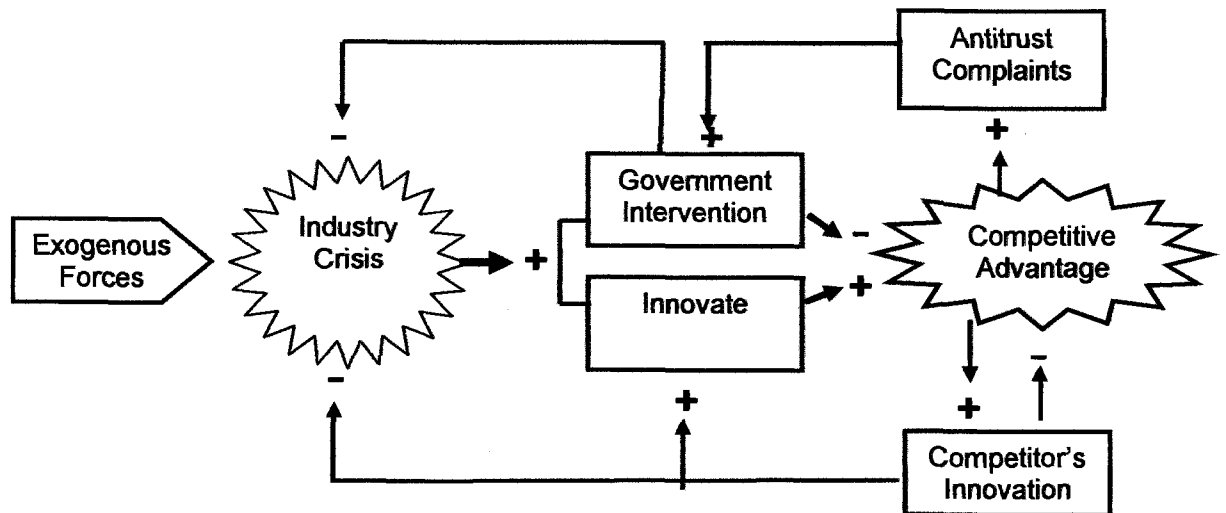
It is important for the reader to note that only three areas of the industry were deregulated with the Airline Deregulation Act of 1978: entry and exit into markets, pricing, and scheduling. In fact, since the 9/11 terrorist attacks the industry has returned to increased regulation. One further element the reader should note is market domination by an increasingly smaller number of players in the industry. The number of industry players has never been significant, ranging from ten to sixteen Majors since 1938, but with so few players, the industry exhibits economic characteristics of an oligopoly. The definition of an oligopoly is “a market situation in which each of a limited number of producers is strong

enough to influence the market but not strong enough to disregard the reaction of his competitors" (Merriam Company, 1961, p. 1572). American and United, dominated the CRS market from 1976 - 1990s as an effective duopoly where duopoly is defined as "a market power situation in which two competing sellers hold the controlling power of determining the amount and price of a product of service offered to a large number of buyers" (Merriam Company, 1961, p. 702). Antitrust regulators are particularly vigilant with industries that are oligopolies or duopolies.

The innovation – regulation cycle was previously presented in Chapter 2 and is now shown in Figure 12. The cycle the figure describes can be traced as:

1. Exogenously or endogenously induced crisis leads to a radical innovation.
2. Radical innovation leads to competitive advantage for the innovator, including above industry rents and barriers to entry.
 - a. Regulators, responding to competitors' request for government intervention or on their own, review antitrust issues of radical innovation which leads to a crisis for the innovator.
 - 1) Innovator uses follow-on innovations or incremental innovations to overcome regulatory antitrust barriers, or
 - 2) Innovator moves out of regulatory spotlight, or
 - 3) Innovator creates another radical innovation.
 - b. Continued competitive advantage for the innovator leads to

Figure 12
The Innovation – Regulation Cycle



competitive crisis for other players.

- 1) Initiate innovative response (often mimetic but also incremental), or
- 2) Respond with another radical innovation, or
- 3) Support government intervention.

3. Each radical innovation leads back to competitors and government's antitrust crises, continuing the cycle of innovation – regulation.

Application of the innovation – regulation cycle to the CRS is shown in Table 16, which reviews the crises, government interventions, innovations, and unintended consequences of the government interventions. A detailed walkthrough of the table is to the reader's benefit:

The industry and government response to an overload of tickets caused by increased air travel, was an industry-wide effort to create a CRS. Once United

broke with the industry and marketed it to Agents, United retained control of the CRS, raising antitrust concerns. In response, the government outlawed commission agreements and antitrust immunity for the Airline Guide with the unintended consequence of forcing Agents to select a CRS. This ultimately led to American and United's CRS duopoly. In response to competitors' complaints of American and United's CRS duopoly, government studies and hearings led to the 1984 CRS rules, which created a crisis for American and United. American and United created follow-on innovations that allowed them to skirt some of the 1984 rules and create new templates for the industry. The regulatory spotlight led to an effort by both airlines to move out of the airline industry and to a more diversified business position. DOT's approval of airline and CRS mergers created a competitive crisis for American and United. Not only did American and United have to defend their above industry rents to antitrust regulators they faced strengthened competitors emboldened by their mergers and more robust CRSs. Table 16 also depicts Southwest's CRS crisis when it was unable to use three CRSs and was charged excessive fees by the remaining CRS, creating a radical innovation, the airline website. Because the airline website is not a key resource this radical innovation does not attract government antitrust attention. Incumbents, led by United created Orbitz, an incremental innovation that bypassed the CRS. Agents, in danger of losing their monopoly power and commission fees, sued the airlines, only to lose in court.

Finally, Table 16 shows the industry crisis caused by the 9/11 terrorist

Table 16
Innovation–Regulation Cycle for Computer Reservation System

Crisis	Government Interventions	Innovations	Unintended Consequences
Ticket processing overload	Antitrust immunity for industry-wide CRS	CRS by United, followed by American	Creates antitrust concerns
CRS antitrust crisis	Outlaw commission agreements; eliminate antitrust immunity for Airline Guide; excessive listings		Agents select CRSs owned by United or American; creates market-share crisis for competitors
CRS crisis for competitors	Government studies and hearings; issues 1984 CRS rules	Mimetic innovation by TWA, Delta, Northwest, and Texas Air	Competitive crisis for first movers American and United
Competitive crisis for CRS first movers American and United	Approves mergers of airlines and CRSs for Delta, Northwest, Texas Air; denies proposed CRS merger between Delta and American	Follow-on innovations by United and American: TACOS, FFPs, yield management systems, code share, alliances, etc.	Divestiture of CRSs; United moves into travel-related industries; American into information management; increased regional CRS competition from Delta, Northwest, Texas Air
Southwest denied access to 3 CRSs and excessive fees for Sabre	Agents' lawsuits denied	Radical innovation by Southwest creates web services, bypassing CRS	Agents lose monopoly power, reduce commissions; CRS monopoly positions broken
CRS competitive pressures	Agents' lawsuits denied	All competitors mimic websites; Orbitz established	
9/11 attack; 2001 recession	\$21 billion in subsidies	Divest CRSs and Orbitz; United bankruptcy and transfer of pensions to PBGC	Growing emphasis on mergers, international markets, and financial reorganization strategies

attacks and the 2001 recession, which led to the divestiture of all CRSs and Orbitz and a request for government intervention in the form of \$21 billion in subsidies. United's bankruptcy and the transfer of its pension to the Pension Benefit Guaranty Corporation (PBGC) was a radical innovation in response to the financial crises of the early turn of the century. The unintended consequences of these financial crises are the growing emphasis on mergers and acquisitions, international routes that face less intense competition, and bankruptcy strategies.

It is likely that regulators contemplating deregulation never considered radical innovations as key resources nor thought about how they diffuse through the industry or benefit innovators. Yet, it is apparent that this key issue, who benefits from radical innovations, has to be considered in any discussion of innovation. If the benefits of radical innovation are to be taken from innovators, radical innovations soon lose their importance in moving an industry forward and enabling it to deal with critical issues. Why should anyone spend scarce resources to create a radical innovation only to have its benefits confiscated? Why create a radical innovation when your competitors can ask regulators to even the playing field and diffuse the radical innovation into the industry, while they spend their resources on other competitive strategies? This is the very question American and United's executives posed to the Senate Subcommittee (*Computer reservation systems*, 1985). Radical innovations create antitrust pressures as the innovator takes advantage of his/her key resource, leading to regulatory oversight, which in turn requires management's attention and

resources to defend their radical innovation (e.g., Congressional and GAO investigations and the 1984 CRS Rules).

Free Market versus Empty Core

We have seen how crises create innovations, particularly radical innovations, which offer an industry and its innovator the benefit of above industry rents and future resources. We have also seen how radical innovations as key resources draw the attention of antitrust regulators. This is particularly problematic for industries with few players, such as the airline industry. If the airline industry does indeed have an empty core, as supported by evidence in Chapter 3, how do innovators take advantage of their radical innovations to survive the empty core despite the government's antitrust efforts? If, on the other hand, the industry does not have an empty core and the free market view continues to prevail in the US and EU, who should benefit from radical innovations — the innovator, the industry, or the public — and how should radical innovations be balanced against antitrust issues and free markets with competitive entry?

By deregulating the airline industry and unfettering it from overbearing regulatory burdens and regulatory sunk costs, regulators expected innovations to spring forth, reduce costs, create new services, and allow more people to fly on efficient airlines. However innovations, and in particular radical innovations, present a dilemma for free market proponents. Regulators must walk the delicate balance between allowing free markets to prevail (e.g., allowing mergers to take

place when an industry has excess capacity or weak players, allowing radical innovations to remain unimpeded) and antitrust concerns of above industry rents and market barriers created by radical innovations. This is the crux of the problem for free market proponents. Because the industry is becoming more concentrated with a proposed merger of Delta and Northwest in 2008, this issue is an increasingly critical one for those who hold the free market view.

For empty core theorists, radical innovations give innovators above industry rents and market barriers that restrain competition. If the government had not restrained the CRS, could American and United have innovated out of the empty core? Certainly, both were on their way to diversification out of an airline-only business when they were stopped by the pilots' unions (United Airlines, 1988) and DOJ's denial of American and Delta's CRS merger (Dallos, 1989). If United continued its plan to become a diversified travel-related company with its CRS, is it possible that it could have survived recessions with stronger balance sheets and avoided bankruptcy? In the end, United avoided the regulatory spotlight by divesting 50% of its CRS to a consortium of airlines, including US Airways, when it changed its strategy to an airline-only company and needed resources to implement that strategy. That divestiture was touted by DOT Associate Deputy Secretary Robert L. Pettit as evidence of the diffusion of the CRS into the industry (House Subcommittee *Airline computer reservation systems*, 1988).

After American and Delta's CRS merger was denied by DOJ, American proposed divesting its CRS to a consortium of foreign and domestic airlines, following United's lead (Dallos, 1989). If the government had allowed American and Delta's CRS merger and American was able to build a formidable CRS with almost 50% of the market, would that have allowed Delta to strengthen its CRS position, enjoy the benefits of being allied with a stronger partner, and enjoyed the benefits of follow-on innovations such as alliances (see Section 3), and avoid bankruptcy? As it is, Delta eventually merged its CRS with Northwest and TWA, to form Worldspan, a smaller CRS with relatively weak airline partners.

If airlines are able to retain their radical innovations and above industry rents, can they bridge the empty core? A look at American's CRS strategy may shed some light on this. When American declared itself an information technology company in 1987, it was an acknowledgement that the information technology business was more profitable than the airline business and a way out of the cyclical industry. By 1988, Sabre Holdings (parent of Sabre) was valued at \$1.5 billion while its parent was valued at \$2.9 billion. In twelve years, Sabre exceeded American's core business (Clemons & Weber, 1990). CRSs continued to be profitable as reported by GAO (2005a). Using data from McKinsey and Company, a consulting company, the return on capital for CRS/GDS from 1992 to 1996 was 30% compared to a paltry 7% for the core airline business. GAO (2005a) reported the operating profits of CRS/GDS for 2000 to 2001 was 15% versus 5% for the core airline business using data from Airline Business. Another

way to view American versus Sabre is in terms of revenues and net income from 2004 to 2006. As shown in Table 17, American had a loss of \$1,391 million and Sabre had a positive net income of \$518.1 million. Table 17 shows the amount of revenue required to earn profits in the airline business as significant compared to the CRS business. For example, in 2006 American earned a net income of only \$231 million on \$22,563 million in revenues, or a ratio of 1%, while Sabre earned a net income of \$155.6 million on \$2,823.8 million in revenues, or a ratio of 5.5%. Clearly, American, as an airline-only company, must work harder to generate net income than a company such as Sabre Holdings.

American understood the value of its CRS and produced most of the

Table 17
American v. Sabre Holdings Revenues and Profits 2004 – 2006 (\$ millions)

Year	American		Sabre Holdings	
	Revenues	Net Income	Revenues	Net Income
2004	\$18,645	\$(761)	\$2,131.0	\$190.4
2005	\$20,712	\$(861)	\$2,521.3	\$172.1
2006	\$22,563	\$231	\$2,823.8	\$155.6
Totals		\$(1,391)		\$518.1

Note: From "Sabre Holding Corp." and "American Airlines, Inc." by Hoovers, 2007, Hoovers.com.

follow-on innovations, in particular yield management software, FFPs, and TACOs, which are now ubiquitous in the business world. The new business strategy maintained control over labor costs allowing American to threaten to end its airline business if labor was unreasonable. American would have been financially better off jettisoning the airline business and becoming an information technology company, or retaining Sabre as a counter to the enormous losses incurred in the cyclical airline business. However, in its efforts to stave off bankruptcy, American and other airlines were forced to sell their key resource, the CRS.

The DOJ found no evidence that any regulations in the past and most likely in the future eroded the CRS' monopoly power (US GAO, 2003). Despite that finding, the government weighed in on antitrust issues during the entire period CRSs were owned by airlines, as shown in Appendix B, outlined in Table 16, and documented throughout this analysis. These findings lead the researcher to an opposite conclusion from DOJ's conclusion.

Radical innovations eventually diffuse throughout the industry, often by isomorphic forces or are replaced by other radical innovations. Through radical innovation, the industry becomes more dynamic and financially well off as it expands its customer and financial base, all empty core solutions. The CRS was created and deployed in a regulated environment. Crises occur regardless of an industry's regulated or deregulated status. However, the crises triggered by deregulation, antitrust issues, and government actions intensified searches by

industry players to solve these crises or fail. Unfortunately for the airline industry, most of the crises they faced were the result of government actions.

It is not clear if there is a solution to the antitrust dilemma posed to free markets by radical innovations. Empty core theorists do not have a problem with antitrust and radical innovation conflicts since under their solution the industry would be regulated and these conflicts would be resolved by regulators and policy makers. However, empty core theorist will have difficulty creating an environment where radical innovations can thrive and competitive pressures force players to search for radical innovations or fail. As can be seen by Raider's (1998) work and as confirmed by this analysis, innovation is greater among companies when the competitive environment is most severe.

Conclusion

Which view, the free market or the empty core, most closely depicts the CRS in the airline industry? The free market view supports unlimited entry and no government controls. However, the dilemma for free market proponents in an oligopoly is the problem created by radical innovations that lead to above industry rents, market barriers, and antitrust activities. In contrast, the empty core suggests that no long-term financial equilibrium exists because of the inability of the industry to decrease production to match severe drops in demand caused by the cyclical nature of the industry and outside shocks.

If the free market view prevailed in the CRS case, then American and Delta would have been allowed to merge their CRSs and antitrust actions such

as the 1984 CRS rules and the constant regulatory spotlight on American and United would not have occurred. Innovators would have been allowed to use their radical innovations to achieve a much larger and diverse customer base and a stronger financial base. Because free market views did not prevail, the airlines were forced to divest their key resource, the CRS. New Entrants, freed of CRS market barriers by the website, still appear unable to survive. For example, New Entrants JetBlue and ATA appear to be suffering from the same financial difficulties as Incumbents. JetBlue received a \$300 million capital infusion from Lufthansa for a 19.8% ownership because it was unable to meet its current debt obligations (Sorkin & Bailey, 2007). ATA entered bankruptcy in 2004 and again in 2008. Southwest, not forced to cut labor cost through bankruptcy or the threat of bankruptcy, has one of the highest paid labor forces and offered buyouts to reduce employee costs (Cohn, 2007). The free market view does not appear to accurately describe the airline industry, the CRS, and its innovators.

If the empty core view more closely describes the CRS case then airline industry players would have made significant efforts to consolidate, reduce competition through merger and purchase, vertically integrate, create alliances, diversify, and use the CRS to gain above industry rents and create market barriers. This is indeed what the airlines tried to accomplish. Diversification by American and United were examples of efforts to respond to the empty core by providing a larger customer and financial base and would have given them some ability to counteract the empty core during times of significantly reduced demand.

American's diversification plans would have been strengthened by a CRS merger with Delta. American had a strong CRS strategy focus and created the most follow-on innovations. However, because of antitrust actions, and stakeholder and institutional constraints, the airlines gave up their diversification strategies and their CRS, and are facing financial difficulties. Unlimited entry causes further erosions to airline revenues with excess industry capacity and deeply discounted fares in times of decreased demand, which exacerbates the airlines' financial decline.

Can the industry innovate out of its problems, whether it contains an empty core or not? Because of the inherent conflicts between free markets, antitrust, radical innovations, and the airline industry's current form of regulation, the researcher believes the answer is "no." The CRS analysis shows that the conflict between free market view and antitrust and resultant antitrust actions force the innovator to give up his/her key resource.

Is it possible for the government to stop confiscating the innovator's radical innovation benefits and thus allow the industry to innovate out of the empty core? Yes, it is possible but would require a wholesale revamping of the DOJ and politicians' typical response to public complaints of high fares and revenues made by the airline industry over the short-term to survive the long-term. Since antitrust laws have been in place for over a century (the Sherman Act of 1890), it is hard to imagine that antitrust laws will be ignored under a free market view of the airline industry. However, under a regulated environment, as

proposed by the empty core theory, antitrust issues do not arise since they would be managed by regulators and policy makers.

Section 3 will cover the Hub and Spoke innovation and provide a second case in the debate as to whether free markets or empty core views should prevail. Perhaps, more so than the CRS, the Hub and Spoke shows the depth of institutional and government influence in efforts to institute and/or resist change within the airline industry.

Endnotes

1. JetBlue was a New Entrant airline in 2000.
2. Texas Pacific had an ownership interest in Continental and recently aided management in the US Air - America West merger. Texas Pacific is led by David Bonderman, who started with Braniff and moved to Texas Air with Frank Lorenzo, and was renamed TPG Capital.

SECTION 3

HUB AND SPOKE SYSTEMS

This case study is an historical review of the hub and spoke system (hereafter, Hub and Spoke) and the roles of crises and innovation in its development and diffusion in the airline industry. The free markets versus the empty core theory conversation will be addressed, as will institutional persistence and change. One of the tenets of Deregulation was to unleash innovation to benefit consumers and the industry. The Hub and Spoke represents one such radical innovation. Unlike the technical innovation of the computer reservation system (CRS), the Hub and Spoke represents an operational innovation designed to more efficiently move airplanes and passengers along a route. This is in contrast with the original method—the point-to-point system (Point-to-Point). Under Point-to-Point, the CAB divided the country into regions with two or more airlines competing regionally. Passenger service meant switching airplanes and airlines to get transcontinental service, unless it was a flight from one major city (e.g., Los Angeles) to another (e.g., New York). A passenger would fly linearly, for example, from Boston to Chicago, transferring to another airline to continue to Denver, and ultimately to Seattle. In contrast, the Hub and Spoke meant most flights flew to a major airline hub to radiate out to end destinations. Thus, if a person started in Boston he/she would fly to Chicago (a hub of United and

American), and on to Seattle on one airline, with coordinated schedules and baggage transfers and one stop.

Under the intense competition engendered by the Airline Deregulation Act of 1978 (Deregulation), this operations solution became a radical innovation to create barriers to entry. The historical review of Hub and Spoke follows the radical innovation cycle: crises create radical innovations, dominant positions for innovation originators including above industry rents, and the subsequent radical innovation. The innovation – intervention cycle is also analyzed. Lastly, the case study highlights the role of innovation and crises for free market proponents versus empty core theorists in the long-term survival of the industry and their opposing public policies.

The actors that will be examined in this section are as follows. The airlines that existed pre-1938, before CAB controls, and that continue today are American, Continental, Delta, Northwest, and United. While the government classification of these airlines has varied over the years (i.e., trunk carriers, Majors, legacy carriers, and hub and spoke airlines), they will be called Incumbents for this research. Incumbents included in this study are Delta, who created the Hub and Spoke, American, Continental and its parent Texas Air, Northwest, and United. In comparison, New Entrants have come and gone since Deregulation at a failure rate of around 94% (Sinha, 2001). These New Entrants provide a variety of services: all first-class, low cost, Hub and Spoke, Point-to-

Point, etc. New Entrants in this study are Southwest, Midway (Southwest) Airway Co. (Midway-Southwest), and Midway Airlines.

A simple time line of the Hub and Spoke innovation, which will be explored in detail in later chapters of this section, is as follows:

1950 - 1977: management of Point-to-Point routes by CAB; development of Hub and Spoke by Delta as an operations solution; and creation of five FAA slot-controlled airports to mitigate congestion.

1978 – 1984: creation of Hub and Spoke by Incumbents; and demands by New Entrants and other airlines to enter slot-controlled and environmentally noise-sensitive airports.

1985 – 1992: consolidation of Hub and Spoke via mergers, alliances, and bankruptcies; government actions to allow New Entrants into airports, including slot-controlled airports; and increased noise and environmental concerns at airports.

1993 – 2007: government efforts to eliminate airport entry barriers; mergers, alliances and bankruptcies; the rise of low cost carriers and the return of Point-to-Point routes; and the retreat of Incumbents to less competitive international routes.

Section 3 includes five chapters:

Chapter 6 covers the Incumbents as they managed their Point-to-Point systems under CAB control until 1978. Upon Deregulation, United converted its Hub and Spoke system into a radical innovation. Further crises led to the Hub

and Spoke's on-going development and diffusion and the creation of follow-on innovations. As the Hub and Spokes created above industry rents and market barriers to New Entrants the government began to enforce antitrust measures.

Chapter 7 covers New Entrants as they began to enter markets controlled and dominated by Incumbents. The New Entrants developed a number of strategies to survive, which eventually led to their ascendancy beginning in the 1990s and the return to the Point-to-Point system.

Chapter 8 covers how airports operate (i.e., operationally, legally, and financially). This chapter also covers how the government impacts airlines and airports through such activities as antitrust, airport financing, and management of the national airspace. This should give a proper baseline for the understanding of the detailed data that follows.

Chapter 9 provides detailed data on select airports that follow the Incumbents' efforts to create Hub and Spokes as market barriers; crises that changed the competitive equilibria; and new equilibria. The chapter also provides data on select airports that are cost competitive.

Chapter 10 analyzes the Hub and Spoke as a radical innovation used as a key resource, its follow-on innovations, and the crises that created the radical innovation. It follows the Hub and Spoke through the innovation - regulation cycle that led to the return of the Point-to-Point system or a currently existing hybrid system. The George, Chattopadhyay et al. (2006) Framework (GCSB Framework) is used to analyze institutional persistence and complexity, and

resistance to change. The debate between the free market and empty core theory continues in this chapter.

CHAPTER 6

THE RISE OF THE HUB AND SPOKE

This chapter covers the evolution of the Hub and Spoke from an operations solution to a radical innovation as a result of the competitive crisis created by Deregulation's unlimited entry by all "fit, willing, and able" airlines. While the evolution of the Hub and Spoke was primarily overseen by the Incumbents, the Hub and Spoke system is used by both Incumbents and New Entrants. However, this chapter will cover primarily the efforts by Incumbents to manage this radical innovation as a key resource to create above industry rents and market barriers.

Airport Organization

It is important to review a few facts about airports and funding before beginning the historical review. Airport authorities are quasi-governments, either created (e.g., Port Authority of NY and NJ) or an extension of local, municipal, state, or multi-jurisdictional government. Funding for capital projects (i.e., new airports, expansions) is provided by the Federal Aviation Administration's (FAA) Airport Improvement Program (AIP) and Airport Development Aid Program with state and local government matching funds. Tax-free General Airport Revenue Bonds (GARB) are used by most airport authorities to fund improvements. Leases are signed between airport authorities and airlines, with the most favorable terms given to dominant airlines at their airport (Dominant Airline). In

turn, airport authorities rely on the underlying credit of the Dominant Airline(s) to secure favorable bond ratings for GARBs, lower interest rates, and lower costs.

Airlines, airport authorities, and bond agencies require long lease terms, often matched to specific bonds terms for accounting purposes as well as to ensure debt repayment of that specific bond (e.g., 25 – 30 years), with renewal options (see Chapter 8). Airlines often have the exclusive use of gates and other real estate that they lease and improve, for example, waiting and baggage areas or ticket counters. Improvements require significant capital and airlines and their creditors and stockholders need assurance that they can recoup their expenses, make a profit, and depreciate costs over a reasonable period. Generally accepted accounting principles (GAAP) requires capital depreciation over the primary lease term. The FAA has found in their investigations that:

Many of the business practices in effect today ... were adopted decades ago in response to specific economic, financial, and political conditions. ... [P]ractices, such as entering long-term, exclusive-use gate lease agreements, were considered essential to securing long-term financial commitments from ... carriers, thus reducing perceived risk for investors ... and lowering the cost of capital... (US FAA/OST, 1999b, p. 71).

Airports are complex organizations, constrained by many laws and regulations given their public ownership (see Chapter 8), and provide a critical public service within the air transportation system. Airports and the national air space parallel the federal highway system with airports representing the entrances and exits to the highway that is the national air space across the country. Air traffic controllers, FAA employees, coordinate the traffic in the air

space and at airports to ensure the safe and orderly arrival and departure of flights. Airport operations include:

1. *Real estate*: ticket counters; gates; aprons; jetways; aircraft parking, servicing, and handling areas; passenger loading and unloading areas; baggage areas; waiting lounges; and administrative space.
2. *Equipment*: computer reservation systems (CRS) and hardware, and baggage, maintenance, and flight training equipment.
3. *Services*: baggage handling, food catering, maintenance, and cleaning.

Airports are not only defined by geographic location, they are also defined as:

1. Large, medium, and small hubs, and primary and non-primary non-hubs, based on number of enplanements¹, in which enplanement is a passenger boarding a flight (US GAO, 1991);
2. Market concentrated, where one or two airlines dominate
3. Slot-controlled² created by the FAA's High Density Rule, where an airport "slot" is landing and take-off rights at a particular time (See Appendix C for the text of the High Density Rule of 1969); and
4. Perimeter-controlled³ where flight distance or airplane capacity is limited.

Different geographic regions have a different mix of airports:

1. Large and medium hubs in close proximity. For example, San Francisco is serviced by San Francisco International Airport (San Francisco Airport), Oakland International Airport (Oakland Airport), and Mineta San Jose International Airport. Washington, D. C. is serviced by Washington Dulles International Airport (Dulles Airport), National Airport, and Baltimore-Washington International Airport (Baltimore Airport).
2. Large hub airport and a satellite airport, for example, Chicago's O'Hare International Airport (O'Hare Airport) and Midway Airport (Midway Airport) or Dallas' Dallas Airport and Love Field Airport.
3. Large hub, such as, Minneapolis/St. Paul International Airport (Minneapolis Airport).
4. Medium hub, such as Memphis International Airport (Memphis Airport).
5. Small hub, such as Hancock International Airport in Syracuse, NY.⁴
6. Small communities with airline service prior to Deregulation and protected with subsidized service.⁵
7. Areas with no commercial airline service, such as some parts of Kansas and Wyoming.

Now, the chapter will continue with a qualitative review of the evolution of the Hub and Spoke system as supported by quantitative data.

1930 – 1977: The Regulated Era under CAB

In the 1930s many airlines were near bankruptcy and service was unreliable (US GAO, 1990aa). The Civil Aeronautics Act of 1938 gave the Civil Aviation Board (CAB) authority over airlines, including route authority. CAB divided the country into regions with two or more airlines competing regionally. Passenger service meant switching airplanes and airlines to get transcontinental service, unless it was a flight from one major city to another. These CAB-conferred routes to fly from one city to another city in a point-to-point route system (Point-to-Point) gave airlines near-monopoly rights. Routes were vigorously fought over, often with years of litigation. Incumbents built their Point-to-Point route networks around the key cities they served with additional routes being awarded based on the location of the Incumbents' existing route networks. For example, Delta was awarded the Atlanta-London route because CAB believed that Delta's network best served the South. Continental spent decades and significant resources building a Point-to-Point route network from Los Angeles to Hawaii, Guam, Australia, and Japan in a long, strung out route pattern. Route networks, with monopoly-like rights, were used by analysts and creditors to estimate future airline revenues. If an airline had strong routes in the Sunbelt, their credit was more favorably viewed than airlines with routes in the Rustbelt. CAB approval was required to exit routes or leave them dormant (e.g., Delta's routes to Havana). Presidential and foreign country approval was required for foreign route awards. In 40 years of regulatory oversight, CAB did

not grant a route to any new Major and the number of Majors shrank from sixteen to ten airlines (US GAO, 1990a).

Delta created the Hub and Spoke system in the 1950s at Hartsfield Atlanta International Airport (Atlanta Airport), its first hub and headquarters, to manage its airplanes, passengers, and routes. It was an operations solution given the cost of equipment (e.g., airplane utilization, airport landing and take-off slots), limited time (i.e., people travel at certain times of day), and route network layout. The Hub and Spoke is defined as a "... a number of feeder routes connected to a central hub where passengers can be collected from feeder flights, transferred to other flights... and carried to their ultimate destination" on the same airline (Standard & Poor's, 1983, p. A32). Adding one route or "spoke" to the Hub and Spoke allowed passengers to connect to many destinations. This allowed airlines to use their airplanes and equipment more efficiently (US GAO, 1993) and achieve economies of density (Brueckner & Spiller, 1994; Caves, Christenson, & Tretheway, 1984). Delta did not take full advantage of this innovation for many years, as will be discussed later.

Hub and Spoke should not be confused with a hub airport. A hub airport is an airport at which one or two airlines have a dominant presence with many flights, a maintenance area, staff areas, and hangars. Whether using Hub and Spoke or Point-to-Point, an airline still has hubs. For example, United has hubs at O'Hare Airport and Denver International Airport (Denver Airport); American

with hubs at O'Hare Airport and Dallas Airport; and Southwest with hubs at Love Field Airport and Midway Airport.

The period prior to Deregulation can be characterized by Incumbents vigorously competing for CAB route certificates, which were the heart of the air transport system. This competition can be summarized as follows:

1. Each Incumbent developed and spent enormous resources maintaining route networks, whether a Hub and Spoke as developed by Delta, or a Point-to-Point, as most Incumbents used given their route networks.
2. Routes were the source of airline revenues as well as the basis for access to capital.
3. Route awards were fought over by competitors, including applying for routes whether they were appropriate or not, and the use of litigation to keep a competitor from receiving a route.
4. Under CAB pricing policy, long distance routes that served heavily populated areas were used to cross subsidize shorter routes that served less densely populated areas.
5. Large airports were at capacity:
 - a. Four slot-controlled airports limited entry;
 - b. Some concentrated airports were dominated by one airline;
 - c. No new airports were built from the late 1970s to the mid 1990s;

d. Public agencies owned airports and used GARBs for financing and matching federal, state, and local funds. GARBs relied on the underlying credit of the Dominant Airline, which in turn relied on the quality of the Dominant Airline's routes. Long term, favorable leases were negotiated with Dominant Airlines that moved the financial risk of airport operations to the Dominant Airline (see Chapter 8); and

e. Environmental issues became increasingly important for airports (see Chapter 8).

6. Incumbents dominated the domestic passenger market by 90% in 1978.

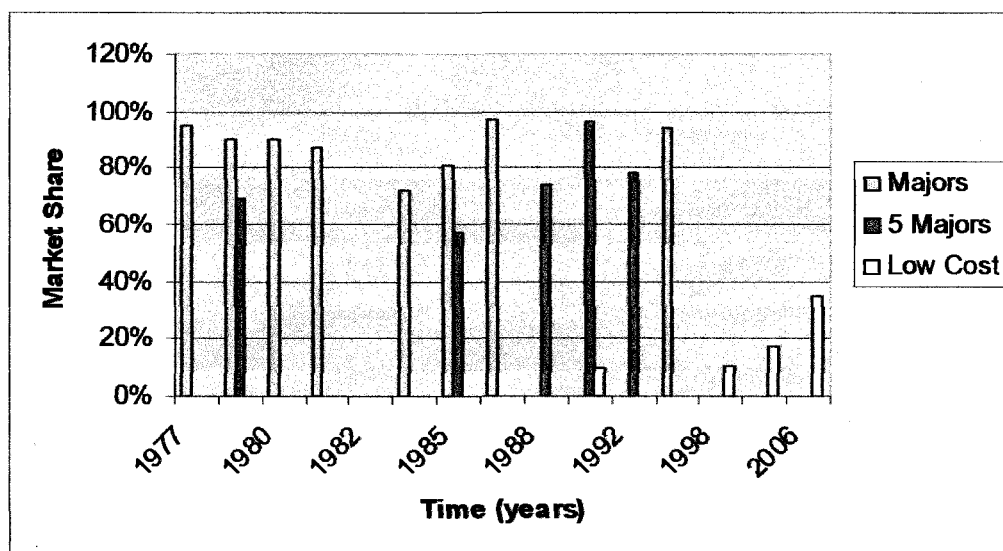
Baselines at or close to Deregulation are established in the next section to allow comparisons in subsequent years of Dominant Airlines' market shares. It is through this comparison that the effect of the Hub and Spoke innovation can best be seen, measured, and understood.

Baselines at the Time of Deregulation

This section gives baselines on market shares of Incumbents, New Entrants, low-cost airlines, and airports at the time of Deregulation. Please note that after 1989, the list of Majors includes low-cost airlines because at that point Southwest and America West had annual revenues greater than \$1 billion. Low-cost airlines are those airlines that charge low fares. In some cases, the data is reviewed through 2007 for completeness. This information is used as the context for the next section, in which the Hub and Spoke became a radical innovation.

Airline market share for Majors is shown in Figure 13 (Bailey, 2006b; Standard & Poor's, 1981a, 1982a, 1984, 1987, 1988, 1991, 1992, 1994, 1997a; US GAO, 1990a, 1993, 2004). It should be noted that "Majors," as used in Figure 13 were all Majors from 1977 – 1983, and, thereafter, were the ten largest Majors, including low cost airlines Southwest and America West beginning in 1989. Majors had 95% of the domestic market in 1977 and 90% in 1978. Market share for Majors dipped to a low of 72% in 1983, following the 1980 - 1982

Figure 13
Market Share of Majors and Low Cost Airlines: 1977 – 2007



General Note: For this graph, Majors is categorized as all Majors from 1977-1983 but only the ten largest Majors in the 1985-1995 timeframe. *Note:* The data are from *Standard & Poor's Airlines Industry Surveys*, by Standard & Poor's, various years; New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission); *Airline Competition: Higher Fares and Reduced Competition*, by US GAO, 1990, Washington, DC: US GPO, p. 30; *Commercial Aviation*, by US GAO, 2004, Washington, DC: US GPO; and "Pairing Up Aloft," by J. Bailey, 2006, *The New York Times*, p. C1 and C4.

recession and a proliferation of New Entrants, only to return to the mid 90% for the largest ten Majors in 1995. Perhaps the most notable finding of Figure 13 is the large market share held by a relatively few airlines despite Deregulation:

1. Majors maintain a healthy market share;
2. The largest five Majors have a disproportionately large market share, with their market share greater in 1992 than their market share in 1979, one year after Deregulation; and
3. The increase in Majors' market share follows the Hub and Spoke's adoption by Majors and its diffusion.

The number of Majors varied from ten to fifteen during this period. Low cost airlines, whose key strategy is low cost fares, will be discussed in Chapter 7.

Another way to view market share is by airport, particularly since CAB awarded routes to the Dominant Airline at that airport. The GAO defines a concentrated airport (Concentrated Airport) as one at which: (1) one airline handles at least 60% of enplaning passengers or (2) two airlines handle at least 85% of enplaning passengers (US GAO, 1990aa). A Dominant Airline is one that has a significant market share in a slot-controlled or Concentrated Airport. Table 18 shows Dominant Airlines' percentage market share at select airports from 1979 to 2000. In 1979, the year after Deregulation, two hubs, Dallas Airport and Salt Lake City International Airport (Salt Lake Airport), were Concentrated Airports. Salt Lake Airport was dominated by Western Air Lines (Western), an

Table 18
Market Share of Dominant Airlines at Select Concentrated Hubs (by
Percentage of All Enplanements): 1979 – 2000

Airport Hub/Dominant Airline(s)	1979	1984	1988	1999/2000
Dallas Airport (American)	65.7%	68.3%	79.0%	79.5%
Minneapolis Airport (Northwest/ Republic)	54.8%	79.3%	83.5%	79.5%
Salt Lake Airport (Delta/Western)	60.8%	78.8%	86.0%	71.7%

Note: The data are from "Economies of Traffic Density of the Deregulated Airline Industry," by J. Bruckener and P. Spiller, 1994, *Journal of Law and Economics*, 37, p. 380; *Secretary's Task Force on Competition in the US Domestic Airline Industry*, by US DOT, 1990, Washington, DC: US GPO, Table II-11a; and *Aviation Competition*, by U.S. Senate Committee on Commerce, Science, and Transportation (*Aviation competition: Challenges in enhancing competition in dominated markets*, 2001), Washington, DC: US GPO, Appendix I, p. 18.

airline that would later merge with Delta in 1986, and Minneapolis Airport was dominated by Northwest and Republic, who merged in 1986. Market share of Dominant Airlines at these airports increased significantly post-Deregulation and it was found Dominant Airlines at slot-controlled and Concentrated Airports received above industry rents (US DOT, 1990; US GAO, 1990a, 1990b, 1993).

Another view of Majors' market share pre-Deregulation was the number of endpoints, that is cities, that Majors served, as shown in Table 19 and Figure 14. Delta made a concerted effort to increase its endpoints, moving from third place to first place from 1979 to 1988, and American overtook Eastern for second place. United started out pre-Deregulation as the largest Major with the most cities

served, but ended up in third place in 1988. Northwest increased the most after it merged with Republic in 1986, followed by Continental and its parent's, Texas Air, aggressive merger strategy.

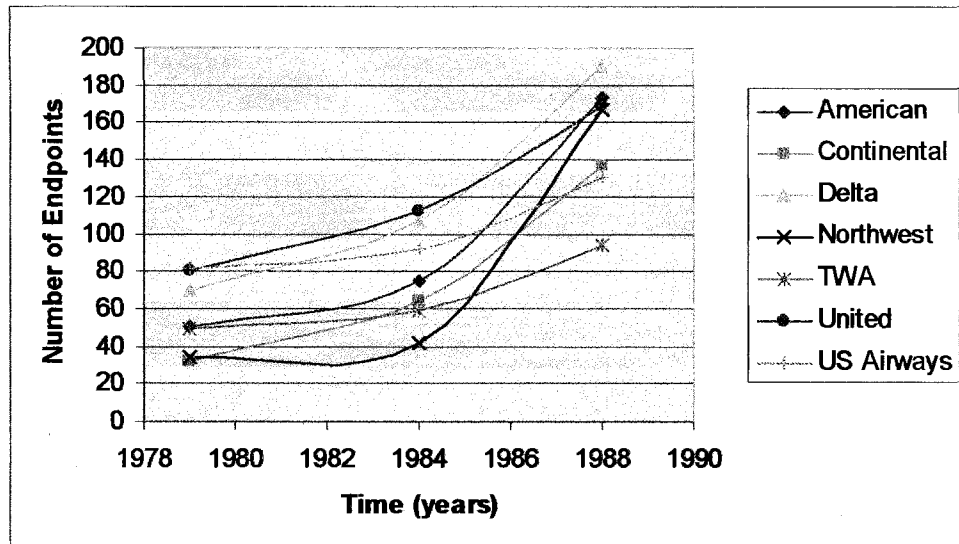
During the entire time that CAB regulated airlines beginning in the 1930s and ending with Deregulation, CAB's social policy on ticket pricing was to cross-subsidize short, lightly traveled routes with more profitable, longer, densely traveled routes (US GAO, 1990a). Lawmakers were concerned that once Deregulation was enacted, small cities in remote, less populated areas would

Table 19
Number of Destination Endpoints Served by Majors: 1979 – 1988

Airline	1979	1984	1988	Change 1979/1988
American	50	75	173	246%
Continental	32	64	137	328%
Delta	69	107	190	175%
Northwest	34	42	167	391%
TWA	49	59	94	92%
United	80	112	169	111%
US Airways	81	92	131	62%

Note: The data are from "Economies of Traffic Density of the Deregulated Airline Industry," by J. Bruckener and P. Spiller, 1994, *Journal of Law and Economics*, 37, p. 383, *Secretary's Task Force on Competition in the US Domestic Airline Industry*, by US DOT, 1990, Washington, DC: US GPO, Table I-6, and *Official Airline Guide*, July, 1979, July, 1984, and July, 1988.

Figure 14
Number of Destination Endpoints Served by Majors: 1978 – 1988



Note: The data are from "Economies of Traffic Density of the Deregulated Airline Industry," by J. Bruckener and P. Spiller, 1994, *Journal of Law and Economics*, 37, p. 383, *Secretary's Task Force on Competition in the US Domestic Airline Industry*, by US DOT, 1990, Washington, DC: US GPO, Table I-6 and *Official Airline Guide*, July, 1979, July, 1984, and July, 1988.

lose air services or pay higher prices. Therefore, the Deregulation Act included a subsidy for air service to small cities that were receiving commercial air service as of October 1978. Airlines and government perceived short routes to lightly populated areas as unprofitable. As predicted and shown in Table 20 and Figure 15, the eight largest Majors transitioned to the largest one thousand routes post-Deregulation, eliminating shorter routes. Delta and United retained their relative rankings, but American moved from fourth place in 1978 to first place in 1988 and Continental moved from last place in 1978 to fourth place in 1988 after it merged with Texas Air and its various subsidiaries. The last column of Table 20

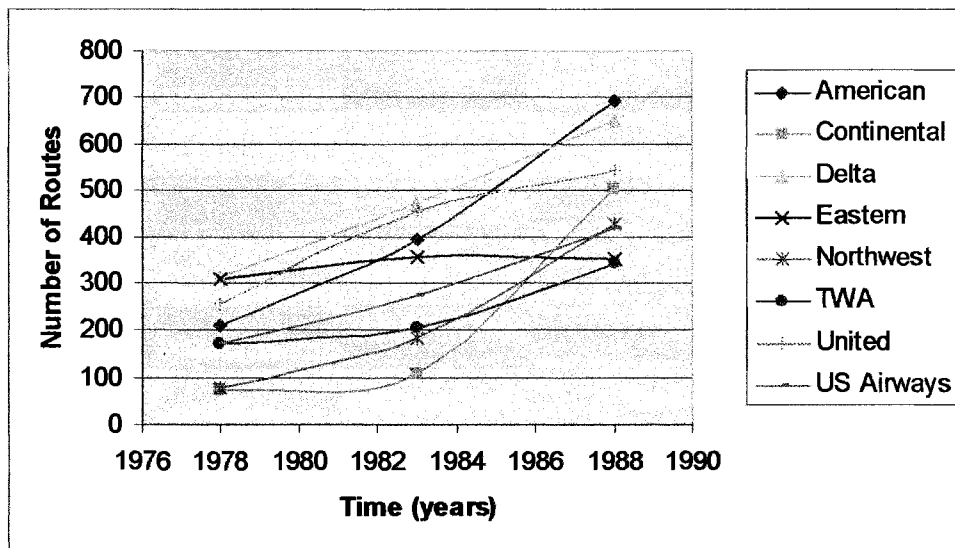
Table 20
1,000 Largest Routes Served by Eight Majors: 1978 – 1988

Airline	4th Q, 1978	4th Q, 1983	4th Q, 1988	Change 1978/1988
American	211	394	692	228%
Continental	73	106	503	589%
Delta	313	470	651	108%
Eastern	307	357	349	14%
Northwest	78	184	427	447%
TWA	173	204	341	97%
United	255	452	544	113%
USAir	173	275	418	142%

Note: The data are from "Economies of Traffic Density of the Deregulated Airline Industry," by J. Bruckener and P. Spiller, 1994, *Journal of Law and Economics*, 37, p. 454, US DOT, 1990, Washington, DC: US GPO, Data Bank 1A.

highlights the amount of change each Major underwent. Continental increased its routes to the one thousand largest routes by 589%, followed by Northwest at 447%, and American at 228%. This meant that these airlines shed many shortroutes and increasingly flew the largest routes. For the remaining Majors, especially United and Delta, they made fewer changes in their route lengths because they already had a large proportion of the one thousand largest routes in 1978.

Figure 15
Number of Largest 1,000 Routes Served by Eight Majors: 1978 – 1988



Note: The data are from "Economies of Traffic Density of the Deregulated Airline Industry," by J. Bruckener and P. Spiller, 1994, *Journal of Law and Economics*, 37, p. 454, US DOT, 1990, Washington, DC: US GPO, Data Bank 1A.

As the reader can see, directly after Deregulation the Majors began to increase their dominance of select airports. They also increased the number of cities they served, including those that included the largest 1000 routes. Ultimately, the five largest Majors were successful in obtaining a larger market share post-Deregulation. It is against this background of increased market share dominance that the investigation proceeds as to how this happened and what role the Hub and Spoke system played.

1978 – 1984: The Rise of the Hub and Spoke

Deregulation allowed entry and exit to domestic routes for all airlines that were “fit, willing, and able” to fly and pricing and schedule flexibility. Deregulation policy makers argued that the airline market was a “contestable market” and not a natural monopoly. A contestable market assumes an incumbent, even a monopolist, will be constrained from charging higher prices on the threat of competitors’ entry. A contestable market, according to policy makers’ thinking, was any airport, whether slot-controlled, perimeter-controlled, Concentrated, or a large hub. These policy makers assumed that entry and exit into markets would be easy because airplanes were highly mobile (US GAO, 1991) but failed to consider the infrastructure (i.e., airports and airspace) in which those airplanes flew. The surprise of Deregulation was the substitution of airport real estate and services for route certificates as barriers to entry (Borenstein, 1992b; Ott, 1979a; US GAO, 1991).

Despite the fact that Delta created the Hub and Spoke in the 1950s, it continued to moved cautiously in the post-Deregulation environment: “We have planned carefully; we have not tried to bite off more than we can chew,” said J. A. Cooper, Senior Vice President of marketing (Aviation Week & Space Technology, 1980ka, p. 71). Its two-fold test was that a new route fit into the existing Delta system and that it was economical. Delta pledged to keep its service to Southern communities and connect them through its Atlanta hub, “the power base for the carrier” (Aviation Week & Space Technology, 1980k, p. 72).

Delta used its dominant position at Atlanta Airport in a defensive move to foil United's entry in the market (1979a, 1979b). In this move, Delta failed to use the Hub and Spoke as a radical innovation. It was not until many years later that Delta understood the value of its system and began to use it offensively as well, purchasing Western's hub at Salt Lake Airport and a 20% interest in two feeder airlines, Atlantic Southeast and Comair.

United, the only Incumbent to support Deregulation, was most impacted by it. Its flights peaked at 1,600 per day, down 25.5% in 1980 over 1979. In 1979, United was the first Incumbent to reconfigure its routes from Point-to-Point to Hub and Spoke as a competitive strategy as opposed to an operations solution. This move served as a blueprint that was later followed by other Incumbents as well as the smaller airlines known as regionals, nationals, local service, and commuter airlines. United reduced its personnel and implemented its long-haul strategy as it was recovering from a strike and the 1980 - 1982 recession began. Executing the most dramatic route realignment while the rest of the industry remained doubtful of its strategy (Aviation Week & Space Technology, 1980k), United was convinced that despite repeated studies it could no longer subsidize losses on short routes (Aviation Week & Space Technology, 1980e). United said the realignment was an extension of the spokes that feed into its hub system. "We're rid of the archaic route structure that impaired our efficiency," said Monte Lazarus, Senior Vice President of United (Aviation Week & Space Technology, 1980k, p. 82). United's Hub and Spoke strategy was an:

... expansion in safe routes that are connected with hub and spoke systems, either increasing frequencies from stronghold[s] or adding connecting routes. Carriers are developing spheres of influence centered in their hub systems, and they are seeking to strengthen their positions in order to meet any challenges that could come from other carriers (Aviation Week & Space Technology, 1980k, p. 71).

The rapid diffusion of Hub and Spokes in the industry was propelled by a series of crises:

1. The industry experienced a series of financial crises that restricted resources. The airline industry lost \$1.44 billion from 1979 to 1982, causing some airlines to sell assets to manage through the financial constraints while other airlines cut costs or went bankrupt as did Braniff International (Braniff) and Continental.
2. The fatal 1979 DC-10 accident and subsequent grounding eliminated 12% of US passenger and cargo service, reducing revenues.
3. The air traffic controllers' strike (PATCO strike) of 1981 - 1982 cutback 25% of flights at the 22 largest airports (Standard & Poor's, 1981a), significantly reduced revenues, and forestalled entry into these airports by competitors.
4. Increased competition between Incumbents as they moved "up" to longer routes (see Table 20 and Figure 15) to more effectively utilize their long-range jets and eliminate their least profitable routes linking small cities (Standard & Poor's, 1982a). This strategic move created a crisis for Incumbents as it left them with a shrinking market in which to intensely compete. Their competitors moved "up" in route lengths to maximize their

airplanes' efficiency and into routes abandoned by Incumbents that now had less competition and more profits (Standard & Poor's, 1980).

5. Deregulation stimulated demand which could not be met, particularly at slot- and perimeter-controlled airports, and other airports with high population densities or in vacation destination locales.
6. The CRS innovation created opportunities and crises: American and United created feeder airline alliances that fed passengers into their Hub and Spokes and gave the smaller airlines access to their CRS at discounted prices, coordinated ground services, and marketing campaigns.
7. Mergers impacted the already small number of industry players, including hostile takeovers.
8. Bankruptcy and financially weak airlines impacted the industry.
9. Southwest and other New Entrants became competitors in the deregulated era, often generating price wars that suppressed revenues (see Chapter 7).

Crisis: Financial Uncertainty

The financial crises that struck the industry during this period are reviewed in detail in Chapter 3, starting with OPEC's oil embargos and fuel shortages, the 1980 - 1982 recessions, price and wage controls, and stagflation from 1973 - 1983. The industry needed \$30 - 40 billion to replace a fuel-inefficient fleet as well as meet FAA mandated Stage II noise standards by 1985 (American

Airlines, 1977). These crises constrained Incumbents as they used key resources to reconfigure from Point-to-Point to Hub and Spoke. Resources were used to write off airport leases, legal contracts, and airport improvements, and to create new airport hubs, such as Continental's new \$20 million hub at Denver (Continental Airlines Inc., 1980), with required access to Agents and key CRSs. Incumbents faced declining revenues, increased competition, and fare wars.

Crisis: 1979 DC-10 Grounding

The DC-10 was a wide-body airplane used for long distances, overseas travel, and where passenger density was high. An American DC-10 crashed at O'Hare Airport in 1979. The National Transportation and Safety Board (NT&SB) looked into its failure and crash and ordered all DC-10s to be inspected and temporarily grounded. This put a strain on all airlines, particularly those who relied on them for overseas travel, such as Continental. After NT&SB approved their return to service two United mechanics found significant cracking over the tail where the third engine was connected, leading to their almost permanent grounding by NT&SB. Shut out of US markets, many foreign airlines objected, as did domestic airlines. Since DC-10s were a workhorse of the industry, small airlines had no alternative airplanes and airplane manufacturers were unable to keep up with demand for new airplanes. Some airlines went bankrupt as a result of the grounding (e.g., Laker's Skytrain) or were severely constrained (e.g., Continental).

Crisis: The PATCO Strike

The PATCO strike reduced flights by 25% in the 22 largest airports. It was illuminating in a few other ways. It provided clear evidence that barriers to entry at key airports could allow airlines to achieve above industry rents. While the 22 airports were artificially constrained by the strike, it prevented entry of new competitors for almost two years. Incumbents suffered from a reduction in flights and revenues, however, they did not face the devastating fare wars that occurred in non-impacted PATCO airports.

The strike also showed the fragility of the air transport system that was managed by the FAA. It established boundaries in the minds of the public, the government, and the airline companies' management as to how much and how rapidly it could expand, particularly in light of Deregulation. Besides air traffic controllers, complex equipment is needed to ensure the safe operation of the air transport system (e.g., radar, weather sensor, instrument landing systems), all of which places limits on the number of flights the system can manage. These limitations became all too clear.

Crisis: More Intense Competition for Incumbents

The Hub and Spoke became a key strategy for Incumbents post-Deregulation. Incumbents were:

... strengthening ... hub[s,]... a vital step in ensuring successful operations,... mandated by ... use [of] their larger jets on longer, denser market segments... [as] illustrated ...by United [who] successfully strengthened its major hub in Chicago... [and] added ... new routes ... at Denver and ... Florida (Standard & Poor's, 1981a, pp. 67-68).

Incumbents not only created Hub and Spokes, but moved “up” to longer, more densely populated routes that better utilized their airplanes. Most Incumbents bought wide-body airplanes (e.g., B-747s, DC-10s) during their last airplane purchase in the 1960s, which were expensive to fly and only profitable with high load factors, that is when a high percentage of seats is filled. Nationals’ airplanes, largely two-engine airplanes usually operated with a smaller two-person flight deck, also were more suited to the lengthened route systems and were efficient, especially during times of rising costs (i.e., fuel) (Standard & Poor’s, 1982a).

Some Incumbents entered new markets. For example, Eastern entered the West Coast market as did New Entrants, leading to fare wars, such as the one involving World Airways and its \$89 Coast-to-Coast fares (Aviation Week & Space Technology, 1977b). Eastern’s entry into the transcontinental market spawned intensified competition in which no airline made much profit, if any (Aviation Week & Space Technology, 1980k). In the Chicago-Los Angeles market, American, Continental, TWA, and United reduced coach fares from \$329.81 to \$99. The \$99 fare was below cost “... officials admitted, but they say they have no choice but to match competition. Yield ... is 5.25 cents per revenue passenger mile, well below breakeven” (Aviation Week & Space Technology, 1980d, p. 33). Continental left the Chicago-Los Angeles market, after flying the route since the 1950s (Continental Airlines Inc., 1980), blaming lack of passenger flow to match competitors’ feed through their Hub and Spokes.

In what would become a continuing post-Deregulation effort by American to bring fare discipline to markets, Wesley G. Kaldahl, Vice President for market reservations at American, stated Deregulation granted the airlines new freedoms that can be abused. "All it takes is a couple of mavericks" and a rational approach to routes and fares can be displaced quickly by a market challenge and an unprofitable discount fare, Kaldahl said (Aviation Week & Space Technology, 1980k, p. 84). Kaldahl said he was not sure whether the apparent agreement among Incumbents that discount fares should be restricted would work out. "We're not quite there yet," Kaldahl said. "United's proposal... could upset the agreement," he continued (Aviation Week & Space Technology, 1980k, p. 84).

Regionals, nationals, local service, commuters, former intrastates, and New Entrants moved "up" to longer routes to fill the vacuum left by Incumbents. Increased competition occurred in the 500 – 2,000 mile routes (Standard & Poor's, 1980). While the more efficient utilization of airplanes should not in itself create a crisis but generate cost savings, because the entire industry moved "up" to match their equipment to routes (see Table 20 and Figure 15), the intensity of competition was greatest on Incumbents. Incumbents had more competition in an increasingly smaller market from which to earn profits. Competitors who acquired shorter routes abandoned by Incumbents faced less competition. As the airline industry suffered through the 1980 - 1982 recessions, financial differences between groups of airlines became greater and greater. Few Incumbents prospered during 1981, with half reporting losses (Standard & Poor's, 1981a). In

comparison, the group of airlines formerly called local-service carriers, intrastate airlines, and a few charter carriers had strong profit gains during the year (Standard & Poor's, 1981a). Incumbents suffered a 4.6% decline in revenue-passenger-miles while smaller airlines and New Entrants had a year-to-year gain of 10.7% (Standard & Poor's, 1982a). During the first nine months of 1982, Incumbents, expending large sums to revamp routes and create Hub and Spokes, sustained a loss of \$351 million, while the leading nationals reported a profit of \$48.3 million, inclusive of a \$64 million loss for Air Florida (Standard & Poor's, 1982a). As the smaller airlines moved "up" and prospered, several of them acquired larger, longer-range airplanes to expand services (Standard & Poor's, 1982a), creating additional competition and excess capacity within the industry.

Crisis: Demand for Airport Space

The increased demand for airline service in the aftermath of Deregulation turned the Hub and Spoke system into a set of barriers, both physical and strategic that constrained competitor entry. Examples include the following:

1. airport real estate, such as gates, waiting areas, and ticket counters;
2. airport leases;
3. slot-controls that control landing and departure rights at certain times;
4. perimeter-controls that limit flight distance and the size of airplanes;

5. and strategy barriers such as CRS, yield management software, hub density, marketing, predation, and mutual forbearance.

Hub and Spoke barriers are also the result of Regulation-era standard operating procedures and customs that are difficult to reorient in the deregulated environment such as long term leases; bond financing; mutual self-interest of airport authorities and Incumbents; and the inability of airports to expand due to environmental and funding constraints. Airports, part of the nation's infrastructure, represent regional assets that are required by businesses and government as well as the local populace to conduct business and everyday life. Airports and their related real estate represent significant sunk costs and commitments that require years of planning and execution and are expected to provide years of benefits. "Airports were once the most stable institution in the aviation industry," said Raymond G. Glumack, Executive Director of the Minneapolis-St. Paul Airports Commission (Aviation Week & Space Technology, 1980f, p. 55). Post-Deregulation, airports became the focus of protracted battles for entry, and Hub and Spokes became fortresses that blocked entry.

Environmental concerns constrained airport operations and expansions, beginning at JFK Airport with protracted and very public displays against the Concorde Supersonic airplane, moving through the California courts, and diffusing to the rest of the nation (see Chapter 8).

The slot- and perimeter-controlled airports caused the most competitors' complaints and demands for airport entry. These airports are located in dense

urban areas with limited ability to expand. Slots, established in 1969 under the FAA's High Density Rule, allow airlines to depart and land at specific times and were granted to specific airlines pre-Deregulation. Airline scheduling committees, made up of airline slot owners, met periodically to adjust times and swap slots. A federally sponsored study of scheduling committees found that slot users maintained the status quo and did not allow New Entrants into airports despite the public interest (Aviation Week & Space Technology, 1979g). Scheduling committees had antitrust immunity. CAB opened investigations as to whether that immunity should continue (Feazel, 1980). Later studies by the FAA found that traffic congestion at congested airports, including slot-controlled airports, rippled through the rest of the national transportation system.

As an example, the case of the National Airport slot committee is indicative of the situation. In 1980, New York Air, a New Entrant subsidiary of Texas Air, sought 24 slots between La Guardia Airport and National Airport. National Airport's slot committee was under extreme pressure by regulators to accommodate these New Entrants, but slot committee members were worried that any decrease in the number of slots would become the baseline for future slot allocations. Thus, American, Eastern, and TWA, who controlled large blocks of slots, were reluctant to release them. Slot decisions at National Airport involved airline schedules that were set six to twelve months in advance; airplane utilization with movement of airplanes to other less profitable routes if slots were lost; inability to use airport assets if slots were lost (Aviation Week & Space

Technology, 1980f); and investment decision uncertainty and risk (Feazel, 1980). The National Airport slot committee, beset by New York Air and Incumbents' demands, was deadlocked and unable to function.

Polinomics Research Laboratories of Pasadena, CA, hired by CAB and the FAA to study slots, recommended a single-price auction system for peak-hour slots and were critical of the current "grandfathered" slot system (Aviation Week & Space Technology, 1979g). Other offered ideas were lotteries; variable landing fees; and an allocation system based on slot history, passengers per slot, and cities served by nonstop service (Feazel, 1980). DOT chose an allocation system that took slots from several Incumbents, American lost over 25% of its slots, and forced others into less desirable slots early in the morning or late in the evening or on weekend days to make room for New Entrants, including New York Air (Aviation Week & Space Technology, 1980f).

At that point, Northwest and Norfolk International Airport's (Norfolk Airport) Port and Industrial Authority filed suit over National Airport's slots. Northwest said that DOT's allocation plan was an unfair taking and inconvenient to travelers. The three-panel judge of the 8th District Court of Appeals denied Northwest's suit stating that a delay in the allocation plan would cause "substantial harm and inconvenience to a substantial percentage of the traveling public" (Aviation Week & Space Technology, 1980h, p. 38). Norfolk Airport Authority's CAB petition was based on whether airlines owned slots to National Airport or cities at the destination end point. That is to say, did United and National Airlines have the

right to use Norfolk's slots to serve other cities? CAB denied the petition, stating, "To intervene now on behalf of a particular city ... would be unfair to other communities that desire access to National Airport and would compound the problem of [slot] allocation" (Ott, 1979b, p. 25). The Airport and Airways Improvement Act of 1979 made the Transportation Secretary the final arbiter of airport access, with rights to overrule slot committees and airport authorities, investigate, and conduct hearings.

CAB and the DOJ considered the sale of slots. Sanford M. Litvack, Antitrust Division of DOJ, said, "... a free ... exchange ... [of slots will give Incumbents] experience which can be employed in easing the transition ... to a full market mechanism..." (Aviation Week & Space Technology, 1980h, p. 38). Braniff, in bankruptcy, released a number of valuable slots at slot-controlled airports, which were selling for as much as \$200,000 each at La Guardia Airport (Standard & Poor's, 1982c). It was not until 1985 that the FAA revised the High Density Rule, seven years after passage of the Deregulation Act.

Another competitive battle between Incumbents and New Entrants focused on large airports that were neither slot- nor perimeter-controlled. Incumbents created and maintained dominant positions at such airports, previously described as Dominant Airlines at Concentrated Airports. Large airports were overwhelmed with access requests and small and medium-size communities feared they would lose air service (Ott, 1979a). J. Donald Reilly, Executive Vice President of the Airport Operators Council International, an airport

trade group, said proposed federal safeguards to ensure New Entrant access to busy airports were “unnecessary” and, he continued, “We do not share the concern of the CAB that there has been or could be mischief at airports by excluding new entrants. Airports want to expand and grow. . . capital expansion could solve the problem of overloaded facility” (Ott, 1979a, p. 46). While the list of Concentrated Airports varied over time, Charlotte/Douglas International Airport (Charlotte Airport), Greater Cincinnati International Airport (Cincinnati Airport), Detroit Metro Wayne County Airport (Detroit Airport), JFK Airport, La Guardia Airport, Minneapolis Airport, National Airport, O’Hare Airport, and Greater Pittsburgh International Airport (Pittsburgh Airport) were competitively constrained over the study period. Based on 1988 data, GAO (1991) found a Dominant Airline could increase fares by 30% at a Concentrated Airport compared to an unconcentrated airport⁶. Slot-controlled airports allowed Dominant Airlines a 4% increase in fares and a combination of two or more barriers allowed Dominant Airlines to increase fares 5% - 9% compared to unconcentrated airports (US GAO, 1991). Dominant Airlines at Concentrated Airports, including slot-controlled airports, continue to charge above industry rents.

Crises: Computer Reservation Systems and Feeder Airlines

The CRS as a radical innovation produced many follow-on innovations (see Section 2). One CRS follow-on innovation that dovetailed with the Hub and Spoke was the creation of feeder airlines: those smaller airlines, whether

regionals, commuters, or New Entrants that chose to move passengers to a Incumbent's Hub and Spoke. United began this CRS and Hub and Spoke follow-on innovation through the use of interlining with commuter carriers (Aviation Week & Space Technology, 1980e; Standard & Poor's, 1982a). United's strategy was to increase Hub and Spoke passenger feed to longer routes as it eliminated short routes. "... [T]he best thing we can do is get out of the way and let someone come in who can make a buck ... [on short routes]," said Richard J. Ferris, President and CEO of United (Aviation Week & Space Technology, 1980e, p. 25). Other Incumbents either continued their commuter agreements or contemplated new programs (Aviation Week & Space Technology, 1980e). Interlining was a decades old process of transferring a passenger between two unrelated airlines. Airlines agreed on cost and revenue sharing, while airlines such as Southwest refused to participate in interlining agreements.

The CRS and the Hub and Spoke allowed airlines to form alliances that easily moved passengers between two airlines, usually at more favorable terms than interline agreements. The CRS allowed for the easy coordination of schedules, bundling of ground services, joint marketing efforts, and the prominent display of feeder airlines on the Incumbent's CRS, sometimes multiple times, such that it appeared to the Agent and passenger that the feeder airline was part of the Incumbent and was therefore more likely to be selected over competitors' flights. The feeder airline received free or discounted fees on the CRS, often as a co-host. CRS co-host status provided by American, Eastern, and

United was banned by the CAB's 1984 CRS rules, but feeder airlines continued as alliance partners or as partially or fully-owned subsidiaries. United and Eastern moved feeder airlines' gates closer to their gates, ticket counters, and operations. For example, United and Air California moved adjacent to each other at San Francisco Airport and shared ground operations services. United was willing to break even on ground costs if it improved communications, coordination, and led to more traffic (Aviation Week & Space Technology, 1980e). Of course, when alliances changed, as it did when Air Florida purchased Air California and was eventually acquired by American, it was difficult to relocate airline operations at congested airports.

Northwest's feeder airline program began in late 1979 when it realized the number of passengers was "absolutely astronomical," said Rodger D. Hague, Director of Agency and Interlining. Northwest and other Incumbents made it cheaper to fly on joint flights, those that connected Incumbent and feeder airline, than booking flights separately. Northwest used joint fares and the CRS to mask price differentials and hide price changes from competitors: "... it is ... possible to develop fare advantages that no one notices and competes ... In large markets, if you change your fare everyone jumps to match it. In the small markets they usually don't..." said Mr. Hague (Aviation Week & Space Technology, 1980e, p. 25).

The intensity of the competition among Incumbents created by the Hub and Spokes caused a crisis in feeder airline alliances. Incumbents rushed to sign

up feeder airlines with significant market share before there were left behind (see Appendix D for a list of feeder airline alliances). As will be discussed in Chapter 9, economies of hub densities (Brueckner & Spiller, 1994; Caves et al., 1984) allowed airlines to lower marginal costs and add revenues using a Hub and Spoke. For example, on high density networks, such as Delta's Atlanta Airport hub, the marginal cost was \$107 per passenger on a single average spoke; on a medium density spoke, such as US Airway's Pittsburgh Airport hub, the marginal cost was \$121 per passenger; and on a low density spoke, such as TWA's Lambert St. Louis International Airport (St. Louis Airport) hub, the marginal cost was \$134 per passenger (Brueckner & Spiller, 1994). Low density Hub and Spoke airlines were at a cost disadvantage compared to high density ones (Brueckner & Spiller, 1994). Continental complained of Incumbents' ability to bring route feeds to O'Hare Airport from the East Coast (Aviation Week & Space Technology, 1980k; Continental Airlines Inc., 1980; Kozicharow, 1979), causing it to lose its long-held Chicago market.

Feeder airlines were one step in achieving high hub densities. As noted by Standard & Poor's analyst T. Canning, "... route changes have increased the proportion of travelers able to complete trips on a single airline. One study concluded that the number of travelers able to complete journeys without changing airlines ... had increased by about 35% between 1978 and 1980" (Standard & Poor's, 1982a, p. 66). The more an Incumbent retained a passenger

on its route system, the more revenue it earned, and offensively, prevented a passenger from entering a competitor's route network.

Crisis: Mergers

Deregulation unleashed mergers, beginning in 1979 with Southern Airways and North Central Airlines forming Republic (see Appendix E). Republic purchased Hughes Airwest after it was unable to access Southern California airports due to noise restrictions. Pan Am, an international airline, sought domestic routes to feed passengers to its international routes. Pan Am was to merge with National Airlines, but was stymied by Texas International, predecessor to Texas Air, and Eastern. Texas International bought large blocks of National Airlines shares such that it was able to force CAB to seriously consider whether it should allow the Pan Am – National merger. With these mergers, CAB developed a clearer policy:

The controlling factor appears to be the amount of direct competition in markets between merging carriers. Thus, it has seen fit to approve the combination of Pan Am and National, while turning down the proposed merger of the latter with Eastern because of the potential anticompetitive effects ... It is expected that these and other carriers will try to position themselves in the new competitive environment by merging (Standard & Poor's, 1979b, p. 57).

Texas International's stock trades were investigated by the Securities and Exchange Commission (SEC) as to whether its acquisition of National Airline stock violated exchange laws. Specifically, the SEC investigated Texas International's SEC filings for false and misleading statements about the timing, purpose, manner, and financing of the acquisition and if there were any illegal

agreements or understandings among the airlines involved (Aviation Week & Space Technology, 1979i). While Texas International was eventually cleared by the SEC, the company continued with its hostile purchase of other airlines' stocks. For example, it used its National Airline's stock gains to make a hostile bid for TWA. TWA successfully fought off the takeover, but Texas International continued to increase its cash position for other potential takeover bids.

During the same period, Continental and Western, with routes primarily located in the West and Pacific Basin, tried twice to obtain CAB approval for a merger and failed. CAB's definition of markets, based on the Sherman Act and Clayton Antitrust Act, determined that a Continental - Western merger would control too much of the West Coast market (Aviation Week & Space Technology, 1980g). These two merger attempts, the shutdown of most of Continental's Pacific Basin routes due to the DC-10 grounding and inadequate fuel supplies, and a labor strike made Continental vulnerable. Texas International acquired a large block of Continental stock (Continental Airlines Inc., 1980) and completed a hostile takeover in 1982, only to have Continental file for bankruptcy in 1983. The two masterminds behind the hostile takeovers were Texas International's president, Frank Lorenzo, and his associate David Bonderman, who would later lead Texas Pacific, a private equity firm with extensive holdings in the airline industry.

American business was also subject to hostile takeovers during this time period, spearheaded by companies such as Kohlberg, Kravis, and Roberts. For

the airline industry, attractive takeover targets were airlines with airplanes owned free and clear, large cash positions, and large tax credits. Mergers, however, were not the panacea that many airlines sought. For example, "...the drawbacks [of mergers] often outweigh the advantages ... where integration of [labor] forces can be difficult... in the Pan Am - National Airlines merger: the two airlines are still not fully combined nearly two years after the deal was made" (Standard & Poor's, 1981a, p. 65). Mergers were approved by the CAB, subject to DOJ review. As time passed, CAB loosened its merger-acquisition standards: competition of the merged organization as measured by ordinary antitrust standards, a lower standard (Standard & Poor's, 1981a). CAB was to sunset in 1985 and merger approval moved to DOT with DOJ oversight. Airlines assumed correctly that mergers were more likely to be approved by a more lenient DOT than by CAB or DOJ.

Crisis: Bankruptcy

It is noteworthy that the Hub and Spoke innovation was a critical factor in two airline bankruptcies. With the freedoms under Deregulation, the unsaid but obvious freedom is the freedom to fail. Incumbents significantly revamped their route systems, and Braniff was by far the most aggressive airline in adding routes and new cities, both domestic and foreign (Standard & Poor's, 1982a). As Standard & Poor's analyst T. Canning concluded, "...Braniff's aggressiveness [on route expansions] led the airline into bankruptcy" (Standard & Poor's, 1982a, p. 65). Braniff, in financial trouble and desperate for positive cash flow, responded

to new competitors by trying to transform itself into a single-class, low fare airline with a smaller route system, and cut fares by 45% on all domestic flights. After Braniff's demise, remaining airlines planned to increase fares 30 - 40% on routes where Braniff had been the low price leader (Standard & Poor's, 1982c). The reformulation of Incumbents using New Entrant strategies would be repeated continuously in the post-Deregulation era. In contrast to Braniff were the conservative, gradual route moves by Delta and US Airways to expand their main hubs, Atlanta and Pittsburgh Airports, respectively (Standard & Poor's, 1982a).

Continental spent significant resources after Deregulation:

... to realign its route system to a self-feeding hub and spoke system and ridding itself of the linear route structure it acquired under the regulatory regime... the carrier has begun a new strategy aimed at building on its geographical strengths and focusing on the Sunbelt region and what it terms "the industrial belt" and the West's growing energy business (Aviation Week & Space Technology, 1980k, p. 72).

Continental created new hubs in Denver, Houston, and El Paso; gave up its long held O'Hare Airport slots; added routes to Mexico; and supported its newly acquired routes to Australia and New Zealand (Continental Airlines Inc., 1980). In bankruptcy court proceedings, Philip J. Bates, Executive Vice President and Director in Continental Airlines Corp., Continental Air Lines, Inc., Texas International Airlines, Inc., and TXIA Holdings Corp., confirmed that Continental spent a considerable amount to create a "defensible hub and spoke system" (House Subcommittee *Continental Airlines*, 1984). Continental suffered from poor timing in obtaining routes to Australia and New Zealand, only to lose use of its long-flight DC-10s (Aviation Week & Space Technology, 1979f) and experience

fuel shortages in the Pacific. Continental made poor strategic decisions as it pressed twice for a merger with Western, spending considerable management time and attention on the proposed merger and not on the hostile and chaotic environment post-Deregulation. Finally, Continental's chief executive Robert F. Six, who was with the company since 1938, was replaced by an inexperienced CEO from Frontier Airlines, a New Entrant, A. L. Feldman (Continental Airlines Inc., 1980). Mr. Feldman told *Aviation Week and Space Technology* (1980k, p. 72) he was trying to ... "find the profitable airline within the company," as he laid off workers and reduced flying miles. One of the reasons for Texas International's successful takeover of Continental, and its subsequent bankruptcy, was the massive resources (i.e., management time and costs, and loss of revenues) required to restructure Continental's route network to Hub and Spoke, either by building it from scratch (i.e., South Pacific routes and new hubs) or attempting to build it by merger (i.e., Western).

While Braniff chose Chapter 7 of the Bankruptcy Code, liquidation, Continental chose Chapter 11, reorganization. Continental and its parent continually chose bankruptcy as a means to survive the chaos of the airline industry and to shed debt and union contracts. As was seen in Chapter 3, Continental and its parent's 1991 bankruptcy produced the best EVAs in the entire industry.

Crisis: New Entrants

Finally, Incumbents tried to attack New Entrants directly. In September 1980, Texas International, followed by Braniff, introduced service between Love Field Airport and Houston Intercontinental Airport, matching Southwest's \$24 fare on all flights and providing promotional incentives to its full fare passengers. However, Southwest was unable to respond to the fare battle due to its lack of a CRS (Aviation Week & Space Technology, 1980c) and joined the Cities of Dallas and Ft. Worth and Dallas Airport in court to prevent an interlining Incumbent from using Love Field Airport (Southwest Airlines, 1980). Texas International discontinued its Love Field Airport service five months later (Southwest Airlines, 1980). This incursion into Love Field Airport by Texas International was reminiscent of earlier efforts to dislodge Southwest from Texas, starting with the famous 1971 Braniff attack when Southwest first began service. Braniff cut one-way fares between Dallas and Houston by 50% to \$13 per ticket. Southwest responded with a \$13 fare or a \$26 full fare plus a free bottle of liquor (Knorr & Arndt, 2005). Southwest became the largest liquor vendor in Texas. Southwest was also subject to two conspiracies, in which Braniff and Texas International were indicted for attempting to drive Southwest out of business (Aviation Week & Space Technology, 1977a). New Entrants will be covered more extensively in Chapter 7.

Thus, the period from 1978 to 1984 can be summarized as the period in which Incumbents, led by United, restructured their routes from Point-to-Point to

Hub and Spoke, left short routes to feeder airlines that had co-host status on their CRSs, and large and slot-controlled airports, already at capacity and environmentally constrained, were subject to New Entrants' efforts to gain entry. Large airports became a key resource in the post-Deregulation era, particularly because of standard and customary ways of doing business with airport authorities. The environment was chaotic with a major recession, airplane groundings, fuel shortages, the PATCO strike, and intense competition between Incumbents, regionals, nationals, former intrastate, and New Entrants, which led to severe fare discounts, large industry losses, and bankruptcies.

1985 – 1992: Hub and Spoke Consolidations

As shown in Figure 13, market share for all Majors decreased to a low of 72% in 1983, to rebound to the mid-90% range from 1987 to 1995. The five largest Majors reflected this recovery: from a low of 58% of market share in 1985 to a high of 96% in 1990. This rebound in market share by the Majors, also known as Incumbents and the five largest Incumbents reflects the increased success of implementing the Hub and Spoke as a radical innovation and key resource. Table 18 confirms this by showing Dominant Airlines', also known as Incumbents, larger market shares in 1979 and 1984. In specific, American's market share at Dallas Airport increased from 68.3% in 1984 to 79.5% for the period 1999/2000. Northwest's market share increased from 79.3% to 83.5% between 1984 and 1999/2000. Delta's market share at Salt Lake Airport increased from 78.8% in 1984 to 86% in 1988, although it declined to 71.7% in

1999/2000. Nevertheless, Delta's market share in the post-Deregulation era was higher than in 1979. These significant increases in market share by Incumbents paralleled a period predominated by airline mergers, bankruptcies, and CRS innovations (see Section 2) that gave Incumbents the ability to control key airports, constrain competitive entry, and achieve above industry rents. This period saw Incumbents create major hub fortresses, government investigations, and New Entrants move to secondary airports abandoned by Incumbents.

The chaotic environment of the early 1980s led to worse than industry average debt to capital ratios for many Majors, including American, Braniff, Eastern, Pan Am, TWA, and Western (Standard & Poor's, 1981a). In 1982, Continental, Eastern, Pan Am, and Western had to restructure their debts (Standard & Poor's, 1982a). Continental and its parent, Texas Air, experienced very high debt ratios, leading to their joint bankruptcies in 1983, Texas Air's in 1990 and Continental's in 1991 (see Chapter 3). Airlines hovering on the edge of bankruptcy began to sell valuable assets in an effort to survive, including airplanes, gates, slots, hubs, and routes to foreign countries.

Crisis: Mergers

As shown in Appendix E, airline mergers were a widely used avenue to acquire valuable airport real estate, increase market share, and drive out competition at key hubs. Before Deregulation, the government's policy on mergers of near-bankrupt airlines was different from its merger policy for financially sound airlines. If merger partners were relatively financially sound, the

amount of direct competition in markets between merging airlines was considered in approving or denying a merger. If merger partners were financially troubled, then the government was more likely to approve it, without regard for market competition. CAB's policy was based on prevention of an Incumbent going out of business and stranding passengers and communities. This CAB policy caused the number of Incumbents to shrink from sixteen to ten from 1938 to 1974 (US GAO, 1990a). This merger policy continues post-Deregulation with Republic – Hughes Airwest in 1980; Texas Air – Continental in 1982; United – Pan Am's Pacific routes in 1985; Texas Air – Eastern, Frontier Airlines, People, and Rocky Mountain in 1986; Delta – Western in 1986; American – Air California in 1986; American - TWA in 2000; and America West – US Airways in 2005.

Incumbents seeking to merge with partners who were not financially distressed anticipated that DOT would be more lenient than either CAB or DOJ. Therefore, a large number of mergers were proposed during this period. The Antitrust Division of DOJ opposed (US GAO, 1990a) the mergers of Northwest - Republic and TWA - Ozark Air Lines in 1986 because of concerns of market share domination as well as the United – Pan Am Pacific transfer (Fisher, 1987), but DOT approved them. DOJ's basis for disapproval, affirmed by GAO, was that yields (defined as cents per coupon-mile) rose following the establishment of dominant positions via mergers of competing airlines, the establishment of hubs, or the extension of already dominant positions (US GAO, 1990a). (A more complete description of DOJ's antitrust analysis is in Chapter 8). Across the

country, GAO (1990a) found from 1985 to the first half of 1989 a widening of yield differential (Beutel & McBride, 1992). By 1988 average yields, calculated as the weighted average of cents per coupon-mile with passenger-miles as the weight, earned by Incumbents at Concentrated Airports were twenty cents per passenger mile, almost 38% higher than the average yield at unconcentrated airports (Beutel & McBride, 1992). So, not only were Incumbents able to increase their market shares in the mid 1980s they were able to extract above industry rents.

While mergers were not viewed favorably in the early 1980s due to the difficulty in completing a successful merger of two organizations, especially competing labor unions (Standard & Poor's, 1981a), as access to key airports became more difficult the purpose of mergers changed. Texas Air was a successful hostile merger player with large capital gains from National Airlines and TWA, and a successful merger with Continental. American and United optimized their Hub and Spokes into dominant positions, American by expanding hubs at Dallas, JFK, La Guardia, and O'Hare Airports, and United by expanding hubs at Denver and O'Hare Airports as well. Other airlines, fearing being left behind, began their merger quests.

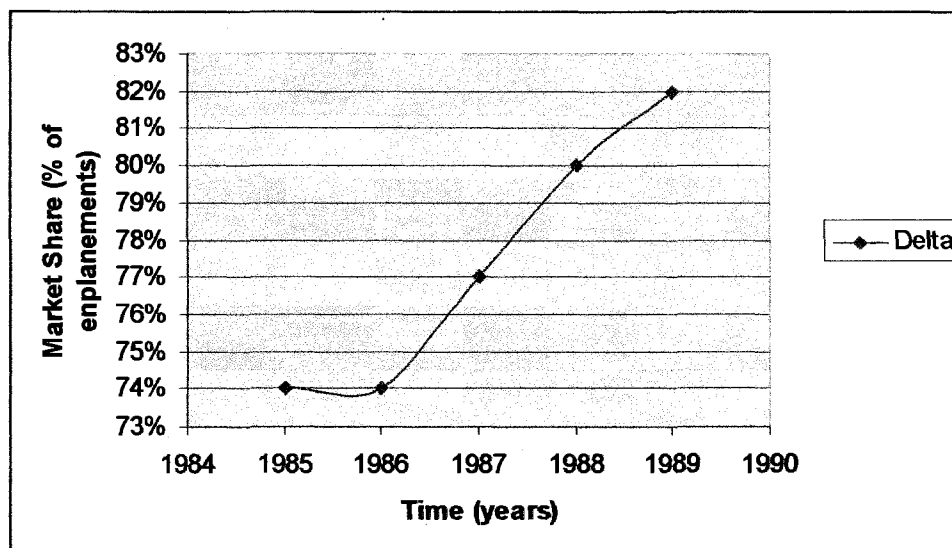
In response to an intensifying competitive environment and CRS regulatory pressure (see Section 2), American's President, Robert Crandall, testified before the House Subcommittee on Aviation of the Committee on Public Works and Transportation, that the fight was no longer about CRS market

control, but control of key airports and "...whether smaller [CRS] vendors that dominate regional hubs are going to be encouraged to use that dominance improperly" (House Subcommittee *Airline computer reservation systems*, 1988, p. 137). American claimed that these merged airlines wanted to drive American and United out of areas of the country they dominated. Crandall said, "The major phenomenon of deregulation is not computer reservation systems, but the development of hub and spoke systems..." (House Subcommittee *Airline computer reservation systems*, 1988, pp. 142). Crandall, in the same House Subcommittee hearing, responded to Eastern and Northwest's merger pleadings before DOT that they needed a CRS to remain competitive,

American does not believe that computer reservation systems played a significant role in the ... mergers ... the true motive in most cases has been the desire to gain control over massive single-carrier hubs... In other mergers ... TWA – Ozark Air Lines and Delta - Western – the desire for access ... to a computer reservation system may have been alleged ... but American believes ... hub dominance far outweighed the computer reservation system aspect (House Subcommittee *Airline computer reservation systems*, 1988, pp. 143).

In 1986, Delta went on the offensive and sought to expand its Hub and Spoke at Salt Lake and Cincinnati Airports through mergers. To do that, Delta merged with Western, by now financially weakened from its two merger attempts with Continental and the general state of the economy, under the CAB's financially-weak merger model. Both Delta and Western shared Salt Lake Airport as a hub. With this merger, Delta's market share increased from 74% in 1985 to

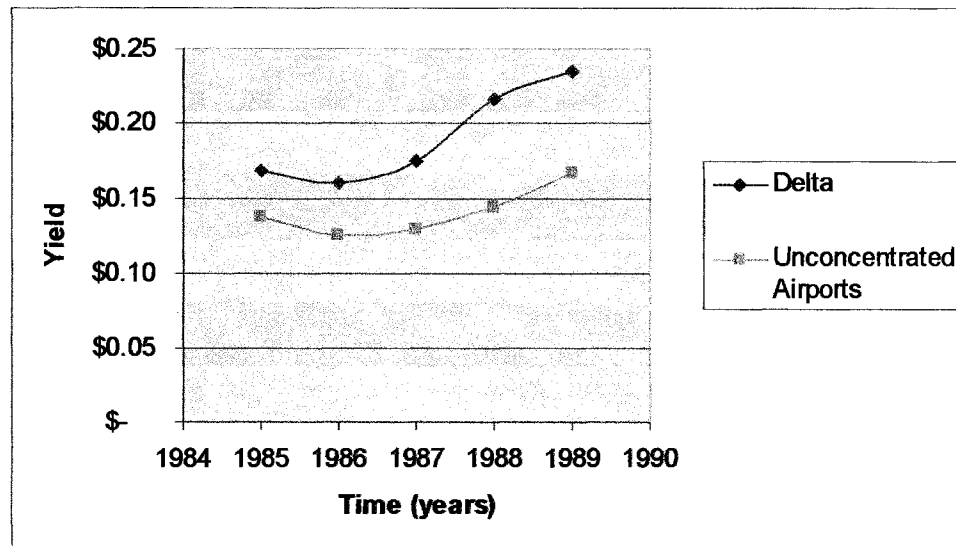
Figure 16
Delta Market Share at Salt Lake Airport: 1985 – 1989



General Note: Delta-Western merger Dec. 1986, 1989 only includes 1st and 2nd Quarters. *Note:* The data are from *Airline Competition: Higher Fares and Reduced Competition*, by US GAO, 1990, Washington, DC: US GPO, p. 43, Table 3. 11.

a combined market share with Western of 77% in 1987, and grew to 82% in 1989, as shown in Figure 16. As would be expected from a significant increase in market share, Delta's yields at Salt Lake Airport increased from \$.169 to \$.235, or a 39% increase from 1985 to 1989, as shown in Figure 17. A comparison group of 38 unconcentrated airports⁶ was developed by GAO (1990a), and while this group's yield increased from \$.138 in 1985 to \$.167 in 1989, its percentage increase was only 21% or little more than half of Delta's yield increase.

Figure 17
Salt Lake Airport Hub Yields v. 38 Unconcentrated Airports Yields: 1985 – 1989



General Note: Delta-Western merger Dec. 1986, 1989 only includes 1st and 2nd Quarters; *Note:* The data are from *Airline Competition: Higher Fares and Reduced Competition*, by US GAO, 1990, Washington, DC: US GPO, p. 43, Table 3.11.

The GAO (1990a) found that before the merger of TWA with Ozark Air Lines, TWA handled 56% of enplanements at St. Louis. The study shows that TWA handled 82% after the merger. TWA's fares rose substantially after the merger in comparison to fares elsewhere and the number of airlines competing at St. Louis Airport declined. TWA's CRS market share among St. Louis area Agents was 77% (House Subcommittee *Airline computer reservation systems*, 1988).

Beutel and McBride (1992) similarly found that the Northwest – Republic merger created substantial market power because their route systems were

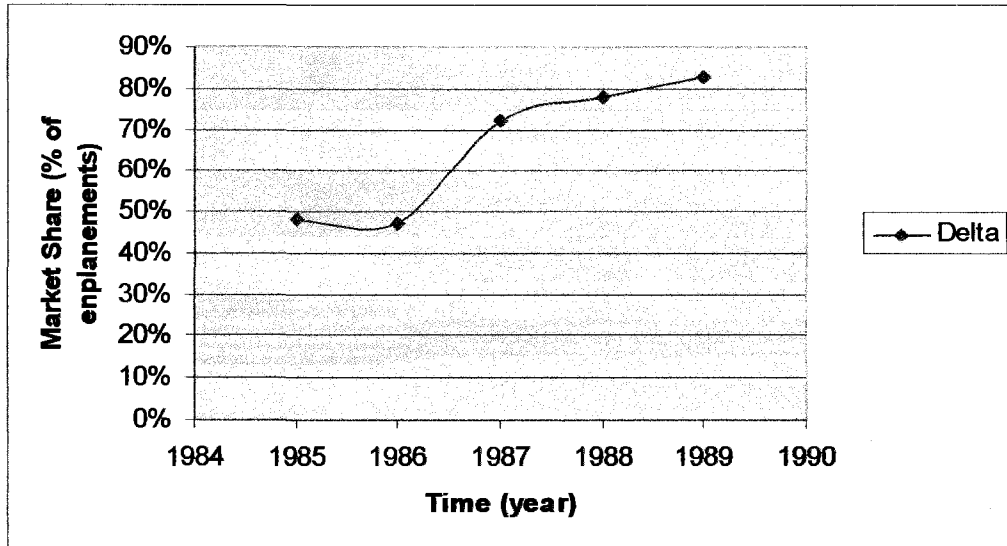
complimentary and they shared the same hub at Minneapolis Airport. As a result, Memphis-based Hanover Travel filed a DOT complaint against Northwest and its jointly owned CRS, alleging that Northwest abused its market power at Memphis Airport, where Northwest controlled about 84% of all flights, by using coercive and threatening tactics, including illegal "parity" demands, to force Memphis Agents to transfer to its new CRS (House Subcommittee *Airline computer reservation systems*, 1988).

The GAO (1990a) found that at airports impacted by mergers, the number of daily departures often declined; the number of destinations served by one airline rose 25%; and the number of destinations served by four or more airlines fell 52%. The conclusion being that the industry had become more concentrated since Deregulation. As shown in Figure 13, the five largest Majors controlled 69% of the nation's air travel market in 1978, increased to 96% in 1990, and while declining to 78% in 1995, was greater than at Deregulation.

Crisis: Acquisitions and Alliances

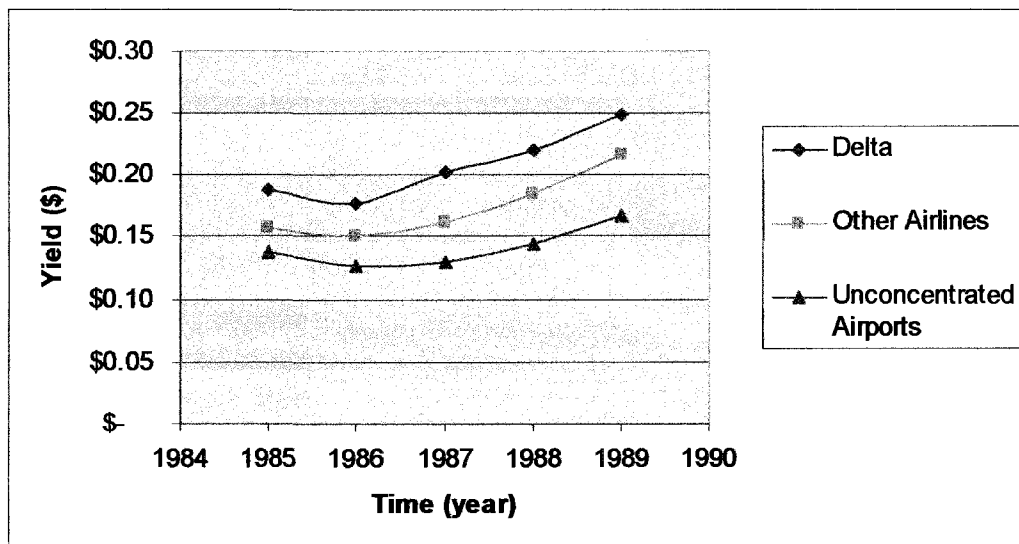
In 1986, Delta acquired 20% of Atlantic Southeast and 20% of Comair (see Appendix D), both feeder airlines. Comair is based at Cincinnati Airport, and with the acquisition, Delta created a significant hub, with market share increasing from 47% in 1986 to 83% in 1989, as shown in Figure 18. Delta's yield increased correspondingly from \$.188 in 1984, to \$.249 in 1989, or a 32% increase, as shown in Figure 19. Other airlines who shared the Cincinnati Airport with Delta

Figure 18
Delta Market Share at Cincinnati Airport: 1985 – 1989



General Note: 1989 only includes 1st and 2nd Quarters. *Note:* The data are from *Airline Competition: Higher Fares and Reduced Competition*, by US GAO, 1990, Washington, DC: US GPO, p. 40, Table 3.6.

Figure 19
Cincinnati Airport Hub Yields: Delta and Other Airlines v. 38 Unconcentrated Airports Yields: 1985 – 1989

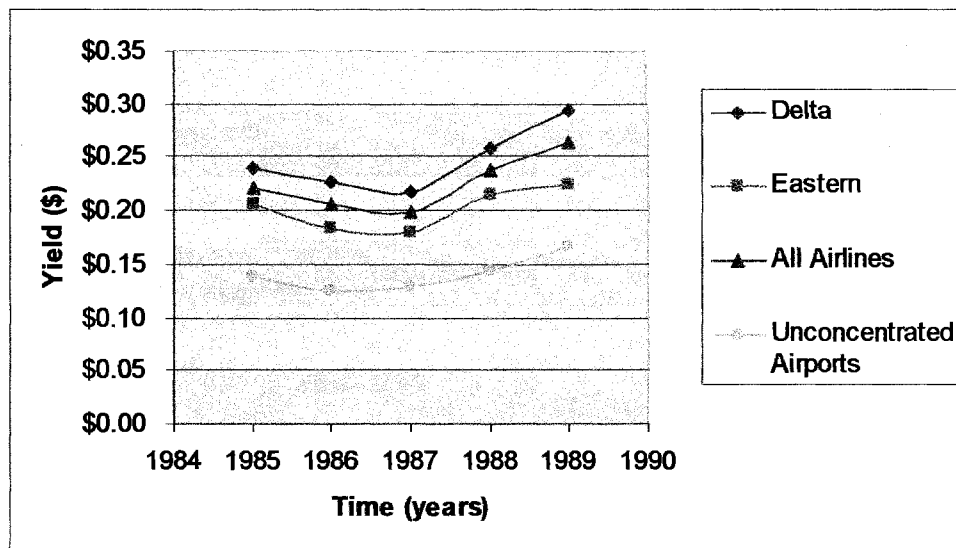


General Note: 1989 only includes 1st and 2nd Quarters. *Note:* The data are from *Airline Competition: Higher Fares and Reduced Competition*, by US GAO, 1990, Washington, DC: US GPO, p. 40, Table 3. 6.

found that they could increase their yields as Delta raised prices, as long as they remained below Delta's prices. This unintended consequence of Delta's Cincinnati hub allowed these airlines to raise their yields by 38%, an even greater yield increase than Delta's. The GAO later found that airlines that are co-located in Concentrated Airports get the benefit of higher yields compared to airlines located at unconcentrated airports. The comparison group of 38 unconcentrated airports increased yields by 21%.

Figure 20 shows the yields for Delta, Eastern, and all airlines, including Delta and Eastern, at Atlanta Airport, compared to yields for 38

Figure 20
Atlanta Airport Hub Yields: Delta, Eastern, and All Airlines v. 38
Unconcentrated Airports Yields: 1985 – 1989



General Note: 1989 only includes 1st and 2nd Quarters. *Note:* The data are from *Airline Competition: Higher Fares and Reduced Competition*, by US GAO, 1990, Washington, DC: US GPO, p. 45, Table 3.13.

unconcentrated airports. Delta enjoyed the highest yields at Atlanta Airport however it was hampered in its ability to charge even higher yields by Eastern. Eastern was a financially troubled company, acquired by Texas Air in 1986, suffered a mechanics strike in 1989, and ultimately went bankrupt that same year. Many financially troubled airlines use severe fare discounting to improve cash flow, resulting in Eastern's yields increasing only 9% from 1985 to 1989. Delta, constrained by Eastern's fare discounting managed an increase in yields by 22%, slightly over the 21% yield increase by the 38 unconcentrated airports comparison group. If all airlines serving Atlanta Airport are included, their yields were higher than Eastern's, reflecting the drag of Eastern's fare discounting on the group's average yields. Delta's CRS market share of Atlanta area Agents was 22%, not substantial enough to command higher yields (House Subcommittee *Airline computer reservation systems*, 1988).

American acquired Nashville Eagle in 1987, later to be renamed American Eagle (see Appendix D). In addition, American acquired Air California from bankrupt Air Florida in 1986 (see Appendix E) and Wings West in 1988 (see Appendix D). These owned airlines allowed American to substantially increase its market share in medium-size airports, specifically at Nashville Metropolitan Airport (Nashville Airport) and Raleigh - Durham Airport (Raleigh Airport).

Another competitive acquisition response is to buy potential competitors before they become a threat. This is often called predation. While predation will

be discussed more fully in Chapter 8, it is an appropriate discussion in addressing the Incumbent's strategies for dealing with the rise of New Entrants. Predation "... keeps alive the possibility that future entrants will also meet an aggressive response and, if this possibility is sufficiently unattractive to these entrants, they may be deterred" (Milgrom & Roberts, 1990). This strategy was

Table 21
Incumbents' Acquisition of Smaller Airlines: 1983 – 1993

Incumbent	Year	Purchased Airline
Alaska Airline	1986	Horizon and Jet America
American	1986 - 1988	Air California (in bankruptcy), Nashville Eagle, and Wings West
Delta	1986 – 1988	Atlantic Southeast (20%), Comair (20%), and Skywest (20%)
Midway Airlines	1986	Air Florida (in bankruptcy)
Piedmont Aviation	1983 – 1986	Empire Airlines, Henson Aviation, and Jetstream International
Southwest	1986 – 1993	Muse and Morris Air
Texas Air (parent of Continental)	1986 – 1987	Bar Harbor (68%), Britt Airways, Continental, Eastern, Frontier Airlines, People, and Rocky Mountain Airlines
United	1992	Partial interest Air Wisconsin
US Airways	1985 – 1987	Pacific Southwest Airlines, Pennsylvania Airlines, Piedmont Aviation, and Suburban

Note: Data compiled by author

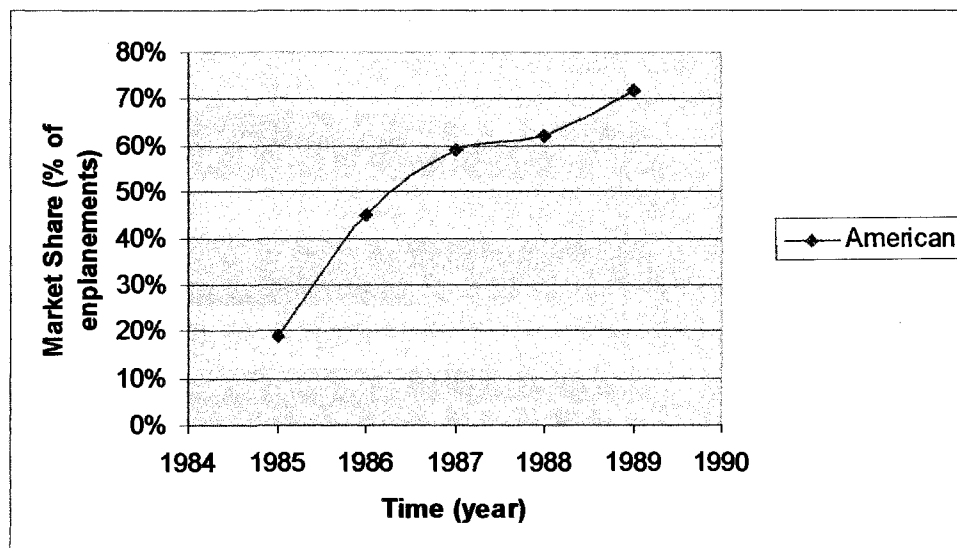
pursued aggressively by Incumbents as shown on Table 21, during a time when met this strategy, as shown in Appendix F, and had a lower antitrust threshold standard than mergers. American's purchase of Nashville Eagle and Delta's purchase of Comair are both examples of predation. It is interesting to note that other airlines, both Incumbents and New Entrants alike, pursued this strategy. However, United was forestalled from participation in this strategy by its pilots union.

An alternative effort by CRS owners American and United was to establish co-host status with smaller airlines that provided CRS services at discounted rates and passenger feed to the Incumbents' Hub and Spokes (see Section 2). When co-host status was banned by CAB in 1984, American and United created code share alliances (see Exhibit F) that provided similar benefits for all parties. A passenger, for example, would fly on code-share airline Metro Airlines that fed into American's Hub and Spoke. The passenger would receive the benefits of frequent flier points (FFPs), joint ground services, and convenient co-location at the airport; the Agent booking the flight would receive travel agent commission overrides (TACOs); and both airlines saw increased revenues from more passengers flying on their routes to and from hubs. American aggressively signed up alliance members: in 1987, American had code share alliances with AVAir, Chaparral, Command Airways, Executive Air Charter, Metro Airlines, and Wings West. These feeder airlines and code share alliances increased Hub and

Spoke densities for American and allowed it to establish a significant presence in Concentrated Airports located in medium-size markets.

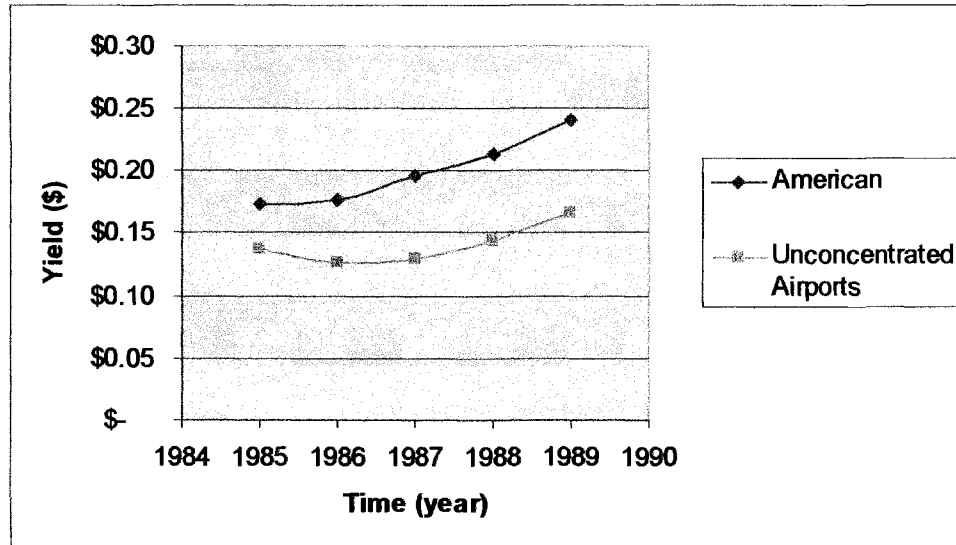
A review of American's market share at Nashville Airport is shown in Figure 21 as 19% in 1985, 59% in 1987, the year it acquired Nashville Eagle, and 72% in 1989. American's yield similarly increased from \$.173 in 1985 to \$.24 in 1989, or an increase of 39% compared to 21% for the control group of 38 unconcentrated airports, as shown in Figure 22. American replicated this conversion of a medium-sized airport to a secondary hub at Raleigh Airport, with an increase in market share from 3% in 1985 to 78% four years later in 1989, as shown in Figure 23. Commensurate with the increase in market share were

Figure 21
American Market Share at Nashville Airport: 1985 – 1989



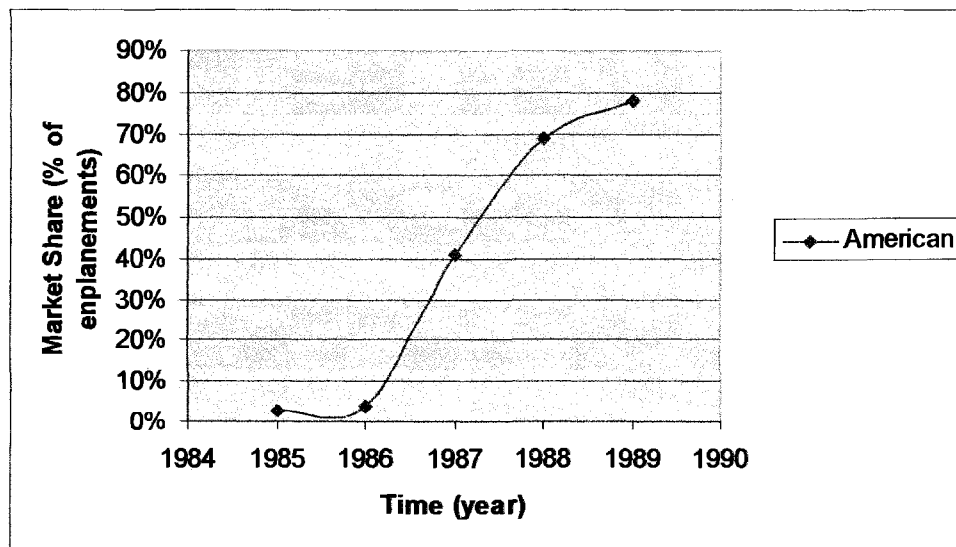
General Note: 1989 only includes 1st and 2nd Quarters. *Note.* The data are from *Airline Competition: Higher Fares and Reduced Competition*, by US GAO, 1990, Washington, DC: US GPO, p. 39, Table 3.5.

Figure 22
Nashville Airport Hub Yields v. 38 Unconcentrated Airports Yields: 1985 - 1989



General Note: 1989 only includes 1st and 2nd Quarters. *Note:* The data are from *Airline Competition: Higher Fares and Reduced Competition*, by US GAO, 1990, Washington, DC: US GPO, p. 39, Table 3. 5.

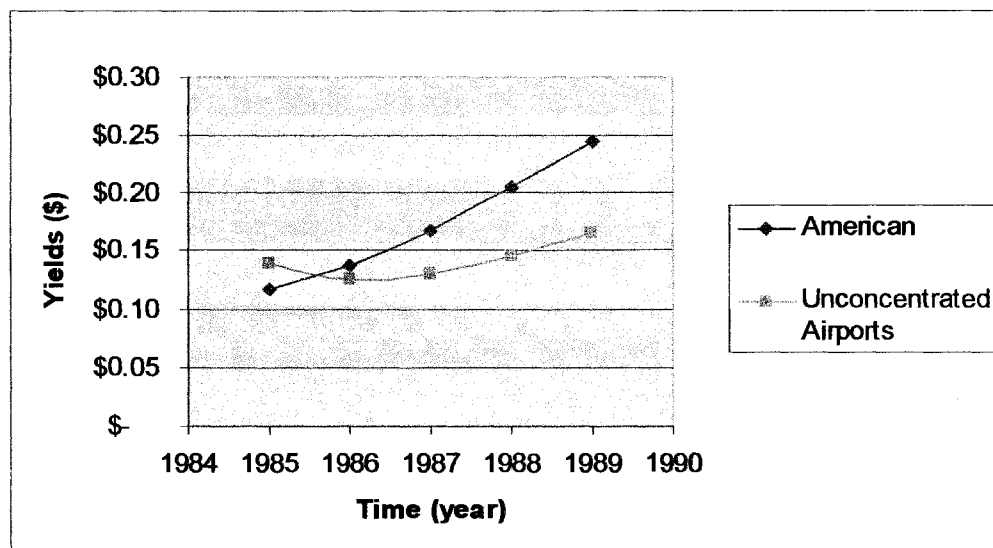
Figure 23
American Market Share at Raleigh Airport: 1985 – 1989



General Note: 1989 only includes 1st and 2nd Quarters. *Note:* The data are from *Airline Competition: Higher Fares and Reduced Competition*, by US GAO, 1990, Washington, DC: US GPO, p. 39, Table 3. 5.

Figure 24

Raleigh Airport Hub Yields v. 38 Unconcentrated Airports Yields: 1985 – 1989



General Note: 1989 only includes 1st and 2nd Quarters. *Note:* The data are from *Airline Competition: Higher Fares and Reduced Competition*, by US GAO, 1990, Washington, DC: US GPO, p. 39, Table 3.5.

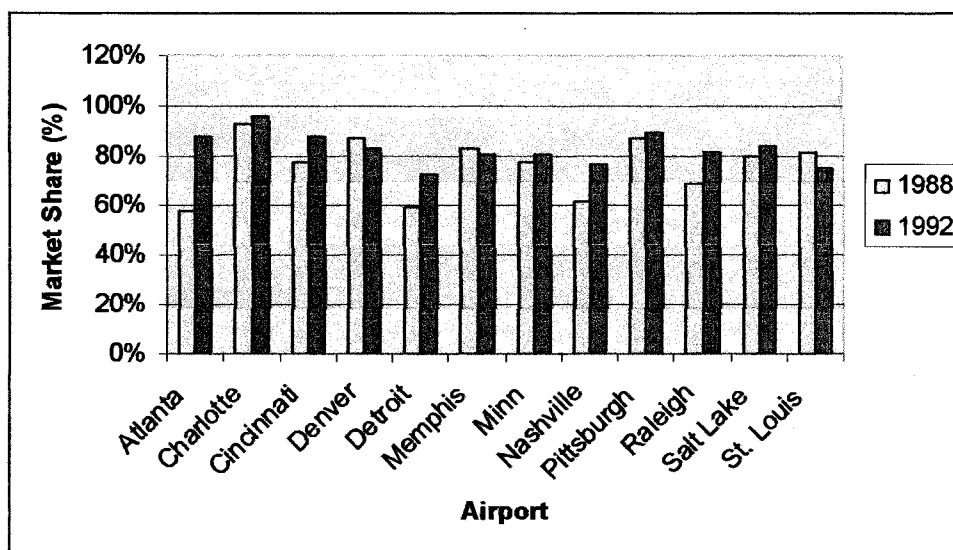
increases in yields for American, as shown in Figure 24. American's yield went from less than the yield for the comparison group of 38 unconcentrated airports in 1985, or \$.116 and \$.138, respectively, to significantly more than the comparison group, or \$.246 and \$.167, respectively. During this time period, American's yield increased 112% compared to the 38 unconcentrated airports yield increase of 21%, or more than four times the increase of the comparison group.

Clearly, through the purchase of feeder airlines, the development of code share alliances, and the use of CRS follow-on innovations, American and Delta were able to create secondary hubs and raise their yields.

Crisis: Concentrated Airports

Airport concentration increased at Concentrated Airports, as shown in Figure 25 and Table 22, where Incumbents capitalized on mergers, alliances, and bankruptcies (US GAO, 1993). Dominance increased at nine of the original thirteen airports studied by GAO from 1988 to 1992 (the only airport not included is Dayton International Airport, which ceased being a Concentrated Airport). Airports that experienced a decrease in market share were the hubs of the financially weakest carriers, namely Continental, Northwest, TWA, and US Airways (US GAO, 1993). Delta had the largest market share increase at Atlanta

Figure 25
Market Share of Incumbents at Concentrated Airports: 1988 – 1992



Note: The data are from *Airline Competition: Higher Fares and Less Competition Continue at Concentrated Airports*, by US GAO, 1993, Washington, DC: US GPO, p. 13, Table 3.

Table 22
Concentrated Airports and Incumbents' Market Share: 1988 – 1992

Incumbent	Concentrated Airport	1988 Market Share	1992 Market Share	Merger/ Bankruptcy
Delta	Atlanta	58%	88%	Eastern bankruptcy
US Airways	Charlotte	93%	96%	Piedmont Aviation merger
Delta	Cincinnati	78%	88%	Comair merger
United/ Continental	Denver	87%	83%	Continental bankruptcy
Northwest	Detroit	59%	73%	Republic merger
Northwest	Memphis	83%	81%	Republic merger
Northwest	Minneapolis	78%	81%	Republic merger
American	Nashville	62%	77%	Nashville Eagle merger
US Airways	Pittsburgh	87%	90%	Piedmont Aviation merger
American	Raleigh	69%	82%	
TWA	St. Louis	82%	75%	Ozark Air Lines merger
Delta	Salt Lake	80%	84%	Western merger

Note: Merger, alliance, and bankruptcy data not included in references below. The data are from *Airline Competition: Higher Fares and Less Competition Continue at Concentrated Airports*, by US GAO, 1993, Washington, DC: US GPO, p. 13, Table 3.

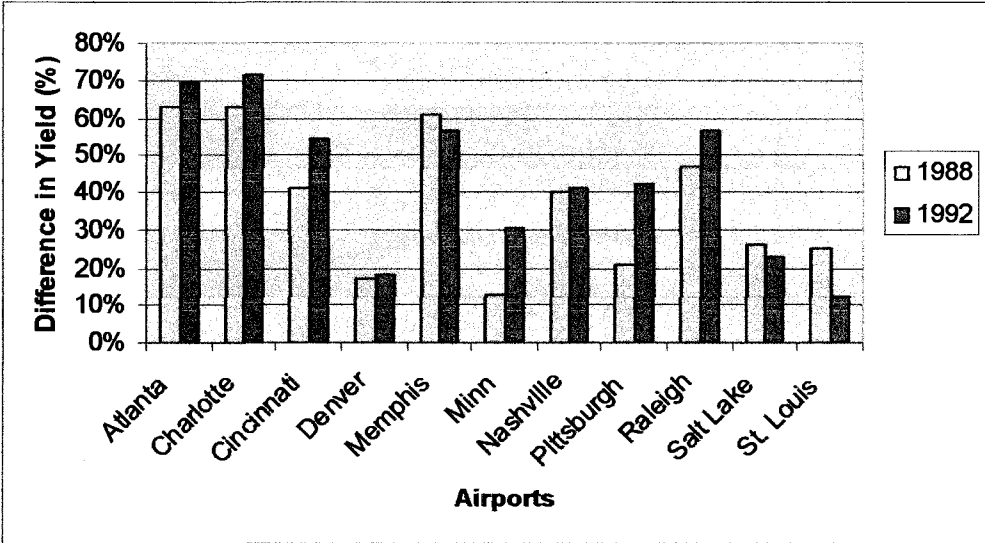
Airport, where yield was 49% higher than its competitors in 1988 and increased to 68% in 1992 (US GAO, 1993). The most significant factor in Delta's yield increase was Eastern's bankruptcy and liquidation, when Delta was able to substantially increase its market share from 58% to 88% and acquire Eastern's slots, gates, and other airport real estate and equipment (see Table 22).

Overall, market share at Concentrated Airports increased in this timeframe. Delta's purchase of Comair allowed it to increase its market share at Cincinnati Airport from 78% to 88% from 1988 to 1992. Its purchase of Western allowed it to increase its market share at Salt Lake Airport from 80% to 84% for the same period. Similarly, Northwest's purchase of Republic allowed it to increase its market share at Detroit Airport from 59% to 73% and Minneapolis Airport from 78% to 81% over the same period. Northwest's market share at Memphis Airport declined slightly from 83% to 81%, but Northwest remained a Dominant Airline at that airport. US Airways was allowed to merge with Piedmont Aviation in 1987. Notably, both companies were the product of many previous mergers — Henson Aviation, Empire Airlines, Jetstream International, Pennsylvania Airlines, Suburban, and PSA. This merger provided US Airways with sizeable market shares at Charlotte and Pittsburgh Airports, 96% and 90%, respectively, in 1992. American's market share at its two hubs, Nashville and Raleigh Airports, increased to 77% and 82% from 1988 to 1992, respectively. Only Denver, Memphis, and St. Louis Airports experienced market share declines for their Dominant Airlines. Continental, with a hub in Denver, and its

parent, Texas Air, entered its second bankruptcy in 1991 and TWA, headquartered in St. Louis, entered its first bankruptcy in 1992.

Figure 26 shows the percentage difference of Dominant Airlines' yields at Concentrated Airports and the amount they differ from overall yields at unconcentrated airports (US GAO, 1993). In Figure 26, excluded airports are Baltimore Airport, both Chicago airports, Dallas Airport, both Houston airports, Los Angeles airports, all New York City airports, and San Francisco Airport because other area airports exist. This holds true for the Figures 27 and 28, as well as for Table 23.

Figure 26
Percentage Difference in Yields at Concentrated Airports v.
Unconcentrated Airports: 1988 – 1992

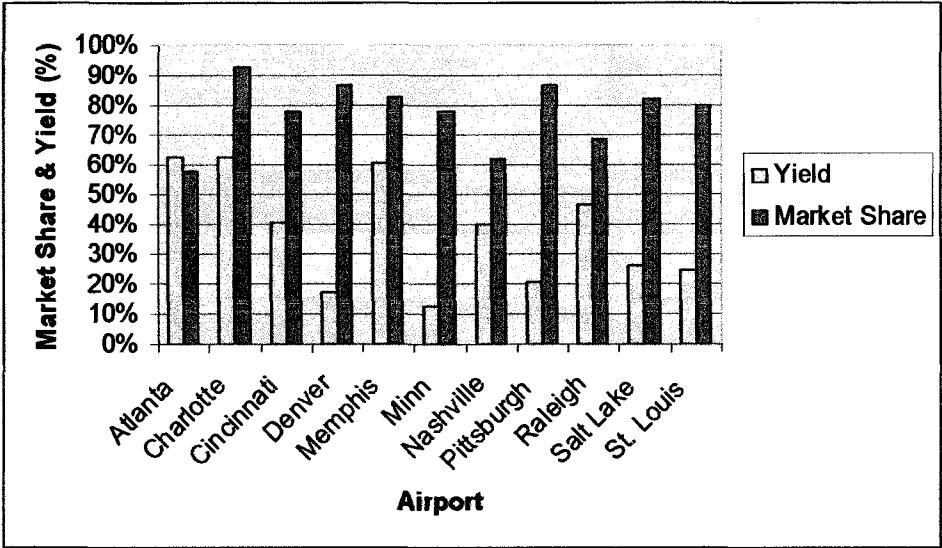


Note: The data are from *Airline Competition: Higher Fares and Less Competition Continues at Concentrated Airports*, by US GAO, 1993, Washington, DC: US GPO, p. 7, Table 1.

GAO used these yield differences to determine if high market share produced greater yields for Incumbents at Concentrated Airports. The Concentrated Airports and Dominant Airlines with the largest yield differentials in 1992 (see Figure 26) were Charlotte Airport/US Airways (71.4%); Atlanta Airport/Delta (69.2%); Raleigh Airport/American (56.7%); Memphis Airport/Northwest (56.7%); and Cincinnati Airport/Delta (54.4%). The Concentrated Airports and Dominant Airlines that experienced small increases in yield in comparison to overall yields at unconcentrated airports or a decline in yield were Denver Airport/United and Continental (17.9%) and St. Louis Airport/TWA (12.4%) all financially weak airlines as previously discussed. Delta at Salt Lake Airport faced New Entrant Morris Air, a low cost carrier created by a businesswoman to fight high fares charged by Delta. Morris Air eventually merged with Southwest.

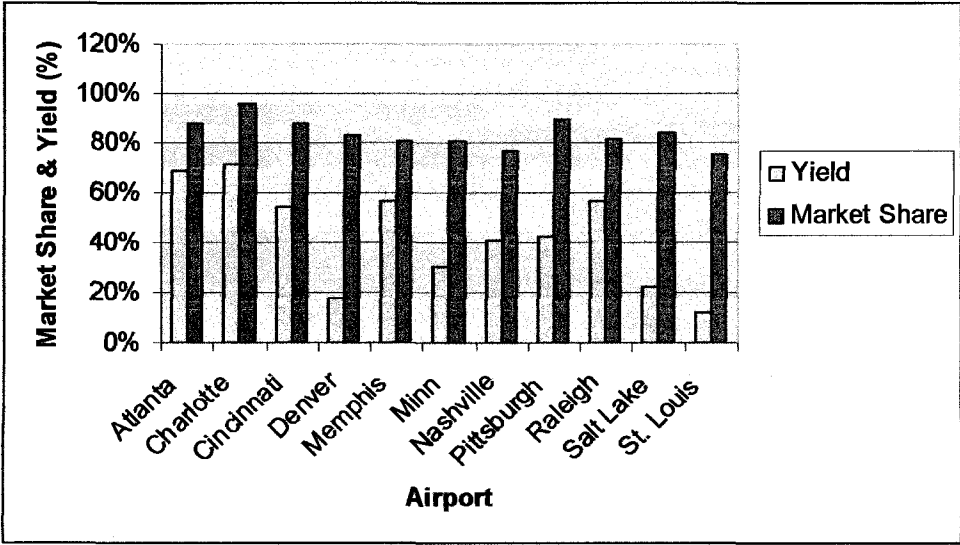
Figures 27 and 28 compare the percentage difference in yields between Dominant Airlines at Concentrated Airports and overall yields at unconcentrated airports and the Dominant Airline's market share at the Concentrated Airport in 1988 and 1992, respectively. In 1988, Atlanta Airport and Charlotte Airport had the greatest yields, or in other words, Delta and US Airways, the Dominant Airlines at their respective Concentrated Airports, were able to realize a yield of

Figure 27
Comparison of Percentage Difference in Yields of Concentrated v. Unconcentrated Airports and Market Share: 1988



Note: The data are from *Airline Competition: Higher Fares and Less Competition Continue at Concentrated Airports*, by US GAO, 1993, Washington, DC: US GPO, p. 7, Table 1 and p. 13, Table 3.

Figure 28
Comparison of Percentage Difference in Yields of Concentrated v. Unconcentrated Airports and Market Share: 1992



Note: The data are from *Airline Competition: Higher Fares and Less Competition Continue at Concentrated Airports*, by US GAO, 1993, Washington, DC: US GPO, p. 7, Table 1 and p. 13, Table 3.

Table 23
Increase in Yield at Concentrated Airports over Unconcentrated Airports:
1988 – 1992

Concentrated Airport and Incumbent	1988 Market Share	1992 Market Share	1988 Yield	1992 Yield
Charlotte/US Airways	93%	96%	63%	71.4%
Atlanta/Delta	58%	88%	63%	69.2%
Raleigh/American	69%	82%	47%	56.7%
Memphis/Northwest	83%	81%	61%	56.7%
Cincinnati/Delta	78%	88%	41%	54.4%
Pittsburgh/US Airways	87%	90%	21%	42.4%
Nashville/American	62%	77%	40%	40.9%
Minneapolis/Northwest	78%	81%	13%	30.3%
Salt Lake/Delta	80%	84%	26%	22.7%
Denver/United and Continental	87%	83%	17%	17.9%
St. Louis/TWA	82%	75%	25%	12.4%

Note: The data are from Airline Competition: Higher Fares and Less Competition Continue at Concentrated Airports, by US GAO, 1993, Washington, DC: US GPO, p. 7, Table 1 and p. 13, Table 3.

63%, higher than yields realized by other airlines at unconcentrated airports, clearly above industry rents. Memphis Airport, dominated by Northwest, was able to achieve a 61% yield. Raleigh, Cincinnati, and Nashville Airports allowed American and Delta to achieve yields ranging from 40% to 47% above the comparison group of airline yields at unconcentrated airports.

By 1992, as shown in Figure 28 and Table 23, the eight Concentrated Airports that experienced an increase in market share by the Incumbent also saw a rise in the yield, except for Salt Lake Airport. The three Concentrated Airports that saw a decrease in market share by the Incumbent saw a small change in their Incumbent's yield (i.e., Denver Airport) or a larger decrease in yield (i.e., Memphis Airport and St. Louis Airport). However, while much of the decline in market share for Northwest was at Memphis Airport, their yield of 56.7% was still substantial and placed Memphis Airport in the four highest yield airports in the country. From 1985 to 1988, GAO (1993) found a 16% increase in the number of routes served by only one airline. Destinations served from Concentrated Airports by only one airline, in contrast, rose from 56% in 1985, to 59% in 1988, and 64% in 1992. This reflected the increasing market control by Dominant Airlines.

Crisis: Intense Competition

Incumbents, New Entrants, and financially desperate airlines resorted to destructive fare wars when capacity levels exceeded demand (Standard & Poor's, 2000), as occurred following the recession of 1980 – 1982. As S. Klein, analyst at Standard & Poor's commented, "Since deregulation, the airline industry has been prone to periodic bursts of destructive fare wars. Some of the blame lies in the aggressive pricing tactics of start-up carriers, which operate with substantially lower costs than the major airlines" (Standard & Poor's, 2000, pp. 18-19). Analyst Klein also noted that one of the strategies of New Entrants

included the "...suicidal strategy to take low-margin leisure traffic from a dominant and popular carrier" (Standard & Poor's, 1999b, p. 9). Fare wars continued through the major bankruptcies and mergers of 1985 – 1986 including for example, the competitions between Delta and Western; Northwest and Republic; Texas Air and Eastern, Frontier Airlines, People, and Rocky Mountain; and TWA and Ozark Air Lines. As the industry consolidated and raised fares, the GAO said in its review of the health of the airline industry:

Many airline analysts believe that fares were too low in 1986 and not consistent in the long run with a financially healthy industry. Thus, in some markets, higher fares might be consistent with improved economic efficiency, and higher fares industry-wide than those prevailing in 1986 may be necessary if carriers are going to earn sufficient revenues to buy new planes and provide investors with an adequate return on their investments (US GAO, 1990a, p. 74).

Besides fare wars, Incumbents responded to competitive threats by New Entrants and other Incumbents by blocking their entry into hubs via leases and other methods that are discussed in Chapter 8.

Crisis: CRS: Trashing, Signaling, and Fare Parsing

Incumbents used the CRS and the Airline Tariff Publishing Company to signal fare intentions at specific airports and against specific competitors. The Airline Tariff Publishing Company is owned by Alaska, American, Continental, Delta, Northwest, TWA, United, US Airways, and other airlines. DOJ began investigations in 1990 of collusion, predatory pricing, and blocking of competitors (Nomani, 1990) and alleged that the airline owners of the Airline Tariff Publishing Company used their CRSs:

... in a manner that unnecessarily facilitates coordinated interaction ... (a) engage in a dialogue. . . (b) communicate to one another ties or links between proposed fare changes. . . (c) monitor each other's intentions concerning increases to fares, withdrawals of discounted fares, and changes in fare restrictions, and (d) lessen uncertainty concerning each other's pricing intentions (U.S. v. Airline Tariff Publishing Co. et al "U.S. V. Airline tariff publishing co, Alaska Airlines, American airlines, Continental Airlines, Delta air lines, Northwest airlines, trans world airlines, united air lines, and usair," 1992, pp. 10-11).

Wall Street Journal reporter, Asra Q. Nomani (1990), uncovered a number of ways airlines signal competitive intent, supporting DOJ's accusations:

1. Attack competitor at its hub:

Carrier A - often a small operator such as Midway Airlines or America West - attempts to boost its business by lowering ticket prices. It enters lower fares in the industry's ... [CRS]. In response, Carrier B - the dominant carrier at the affected airport - not only matches the new fares, but lowers them in other markets that are served by Carrier A. Carrier B may also attach special codes to its new fares to get its message across... some carriers have been known to prefix new fares with the letters "FU" The end result is that Carrier A often cancels its reduction... (Nomani, 1990, p. A1).

For example, in the summer of 1989, America West reduced airfares between Los Angeles International (Los Angeles Airport) and Minneapolis Airports and other airports. Northwest responded with a new fare directed at America West's hub, Phoenix Sky Harbor International Airport (Phoenix Airport), with a round trip fare reduced from \$208 to \$168 for two days. Five days after instituting its new fares, America West abandoned them. In another example, United faced fare cuts on its lucrative O'Hare Airport – Los Angeles Airport routes, instigated by Braniff II (a reincarnation of liquidated Braniff). United introduced a \$99 one-way

fare between Los Angeles Airport and Kansas City, Braniff II's hub. Braniff II, desperate for cash flow, refused to back down, even when United reduced its fare to \$94. After Braniff II's bankruptcy, fares to and from Kansas City increased (Nomani, 1990).

2. Eliminate bargain fares earlier: Northwest and Midway Airlines offered reduced fares from Chicago to Grand Rapids, MI until July 31, 1989. American and Continental matched fares but set their expiration date as July 17th. Northwest moved its expiration date to July 21st and Midway Airlines moved its expiration date to July 18th (Nomani, 1990).

3. Highlight a fare or route on the CRS: If there are any changes to fares, they are highlighted on the CRS. "Sometimes a carrier will make a weird or nonsensical change in a fare just so that analysts at another airline will see the fare highlighted. The message: 'Get rid of this fare'" (Nomani, 1990, p. A1).

4. Attack a specific airline: In November, 1989, Continental used the letters "HP," America West's FAA designated code, in a signaled price war against America West, which days before had invaded Continental's hub at Houston Intercontinental Airport. After America West withdrew its introductory fares at Houston Intercontinental Airport, Continental withdrew its "HP" fares (Nomani, 1990). Other airlines understood that the fare war was only directed against America West. This signaling system allowed other airlines not to view all fare and route actions as the

beginning of a general price war that can cause damage in other markets, but only a carefully targeted assault on a New Entrant (Oster & Strong, 2001).

5. Pre-announcements: the first-available and last-available ticket dates were signals to competitors of intent to create new routes, new fares, or changes. It assured that no airline stood alone with higher fares (Nomani, 1990). If other competitors responded to the signals in a favorable way, the competitor did not necessarily follow through with the proposed fare and route changes, but may have withdrawn the proposed changes before their date commences or expires. If other competitors responded with matching fares or routes, all competitors engaged in competition on these routes with forewarning.

6. Trashing or bombing competitors to enforce discipline:

When Northwest slashed fares out of Chicago last August, a pricing executive at a rival carrier privately threatened to "trash" Northwest's Minneapolis hub if Northwest didn't retreat. When Delta wouldn't go along with a fare increase in January [1989], a pricing executive at a competing airline privately spoke of "bombing" Delta's Atlanta hub ... By trashing and bombing, airlines executives mean punitive fare-cutting with "torture" fares. Midway Airlines, people in the industry say, has been repeatedly "disciplined" by other carriers for trying to go its own way on fares (Nomani, 1990, p. A1).

In *U.S. v. Airline Tariff Publishing Co. et al.* ("U.S. V. Airline tariff publishing co, Alaska Airlines, American airlines, Continental Airlines, Delta air lines, Northwest airlines, trans world airlines, united air lines, and usair," 1992)

DOJ concluded that the eight Incumbents who owned the Airline Tariff Publishing Company and all five dominant CRSs (see Chapter 4) controlled the information systems that signaled competitive intent and strategy and fixed air fares. United and US Airways, users of the CRS Apollo, entered into a consent decree to settle charges in December 1992, followed by the rest of the airlines without admitting guilt (Sanchez, 1994). DOJ accused the Incumbents of inflating ticket prices by up to \$1.9 billion between 1988 and 1992 (Sanchez, 1994). As part of the settlement, new fares must now be available for sale when posted to Airline Tariff Publishing Co., eliminating trial balloons and the opportunity to signal intent. Airlines agreed not to post an expiration date on fares unless widely advertised in newspapers or other general interest media. In a maneuver around the agreement, airlines now post fare increases on the weekends when business is slow and drop increases on Mondays if other airlines do not follow the proposed increases (Sanchez, 1994).

Another CRS follow-on innovation, yield management software, allows airlines to direct specific seats and fares against a competitor and not reduce fares on all seats on a flight. This fare parsing allows the airline to maximize revenues per flight, but still respond to fare discounts. For example, passengers passing through a hub pay a regular fare, while passengers entering the Hub and Spoke at a particular city may have reduced fares. Uniform fares are offered by Incumbents, even if there are differences in service levels, such as non-stop versus connecting routes. It allows competitors to match and coordinate fares,

and in certain markets to establish spheres of influence where flights to key hubs are not challenged (Oster & Strong, 2001). For example, Northwest's fares are not challenged by other airlines in flights to Minneapolis Airport. When Reno Air challenged Northwest in its sphere of influence, other airlines understood Northwest's response was directed at Reno Air and not them. The use of the CRS and its follow-on innovations allow Incumbents to respond to appropriate competitive threats and ignore others that do not pose a specific threat to them. It allows them to maximize revenue per plane and passenger yet respond to competitors, particularly in fare wars.

The CRS and its follow-on innovations in trashing, signaling, and fare parsing allowed Incumbents to signal fare wars in specific hubs they were trying to protect, to coordinate fares among "participating airlines," to discipline New Entrants and financially distressed airlines to hold the line on fares, and to maximize fares where ever possible. This allowed Incumbents to maintain control over their hubs against New Entrants and other competitors, making it almost impossible for either to enter hubs. Through these tactics, CRS owning Incumbents were able to eke out a living despite the fare wars and generally miserable financial conditions. This led to the next era: détente and spheres of influence around specific hubs controlled by specific airlines.

Crisis: International Routes

Unlike deregulated US routes, international routes were controlled by bilateral agreement and assigned to specific airlines. Pan Am, in increasingly

difficult financial straits, began selling its valuable foreign routes, starting with its Pacific routes to United in 1985 (United Airlines, 1985). This purchase was investigated for its anticompetitive effects in the Pacific Division Transfer Case, DOT Docket 43065, 1985 (Fisher, 1987). American, Delta, and United later acquired the rest of Pan Am's international routes as well as those from financially ailing TWA. Prior to this, American and United were primarily domestic airlines and Northwest, Pan Am, and TWA were primarily international flagship airlines. American had routes to Canada and the Caribbean, the latter as a result of a merger with a financially weak airline, and United was granted a Tokyo route in 1983. Continental flew routes in the Pacific and Delta flew a few routes in Europe. By allowing the purchase of Pan Am's international routes by more robust airlines, the government hoped that US airlines could bring a more competitive environment to foreign routes and replace an ailing airline (Fisher, 1987).

This government strategy allowed United, followed by American, to take routes over from Pan Am and TWA, add them to their Hub and Spoke networks, and eventually expand globally. Those who waited too long in this strategy, such as Delta, Northwest, or Continental, were out of luck. They were either closed out entirely or they had to pay much higher costs later to acquire an international Hub and Spoke network. As the US airlines faced tougher financial times domestically, some airlines were able to move overseas to make profits.

The period from 1985 to 1992 was bracketed by periods of severe financial turmoil. The recession of 1980 - 1982 was a major recession that led to fare wars and airline bankruptcies. The period ended with the 1991 recession, which caused the airline industry to "wipe out all cumulative profits earned in entire industry history" (Standard & Poor's, 1992). Incumbents moved to the Hub and Spokes system and used it both offensively and defensively to create above industry rent opportunities. Increases in hub market share by mergers were led by Delta, Northwest, TWA, and Texas Air, and by acquisitions of feeder airlines led by American and Delta. United, constrained by their pilots' union, continued with feeder airline code sharing and moved overseas by acquiring Pan Am's Pacific routes. All of the airlines that owned CRSs vigorously used them to recruit Agents and to benefit from follow-on innovations that increased their market shares and above industry rents.

1993 – 2007: The New Reality – Low-Cost New Entrants

Randall Bennett and James Craun of the Office of Aviation Analysis for DOT reported in *The Airline Deregulation Evolution Continues: The Southwest Effect* (US DOT, 1993) two dramatic changes in the industry. The first was from 1984 - 1988, when Hub and Spokes proliferated. Prices on short-distance markets greatly increased and prices in longer-distance markets dropped considerably. Incumbents, in control of hubs, were able to build sufficient barriers to exert some price controls in short-distance markets, while there was vigorous competition in long-distance markets. This finding matches CAB's understanding

that short-distance travel was more expensive than long distance travel and cross subsidized the two. Incumbents cross subsidized the two types of travel lengths using the Hub and Spoke.

The second dramatic change reported by Bennett and Craun (US DOT, 1993) was Southwest's influence on prices in short-distance markets after 1991. Bennett and Craun said, "Majors... will have to develop low-cost alternatives for competing with Southwest, perhaps in concert with other strategies to minimize the effect of losing local market share to Southwest" (US DOT, 1993, p. 8). Incumbents either abandoned or scaled back in markets that Southwest entered, leaving Southwest the dominant player in 93 of its 100 top markets (US DOT, 1993). Incumbents reacted to this crisis with alliances, feeder airlines, mergers, low-cost subsidiaries, predation, fare wars, détente, and market abandonment.

Crisis: Low-Cost Subsidiaries

Starting in 1994, United tried to emulate Southwest's operations by creating a subsidiary within the larger organization. This new, short-haul, low-fare division would have a Point-to-Point network, one type of airplane, workers dedicated to its subsidiary, lower labor costs, and greater worker flexibility. However, as McCabe (1998) found, there are many factors to achieve Southwest's success and most low-cost subsidiaries fail. Southwest entered the California market in 1989, and while United had 37% of the market between Northern and Southern California in 1993, its market share dwindled and with the 9/11 terrorist attacks, dismantled Shuttle by United in 2001 (New York Times,

2001b). In 2002, United again considered a low-cost subsidiary (Baker, 2002), and created Ted in 2004 with the goal of having it carry 30% of its passengers (Standard & Poor's, 2004a). It, too, was abandoned when high fuel prices created a financial crisis for the industry (United Airlines, 2008).

A number of Incumbents emulated United's low-cost subsidiary strategy. Delta created two low cost subsidiaries: Delta Express in 1996 and Song in 2003, both of which folded. Delta Express was created to fight New Entrant ValuJet/AirTran, but it was not used in Delta's lucrative Atlanta Airport hub (Oster & Strong, 2001). US Airways created MetroJet in 1998. Like Delta, the subsidiary wasn't utilized in high hub premium airports like Charlotte Airport, but competed at Baltimore Airport against Southwest. US Airways ended MetroJet after the 9/11 terrorist attacks. Continental created Continental Lite, which also failed to capture market share. While the low cost subsidiaries were meant to fight market incursions by low cost airlines, Forsyth, Gillen et al. (2005) contend that these subsidiaries were also used to fight antitrust predation accusations when Incumbents entered into fare wars with low-cost airlines. If Incumbents don't match New Entrants' low fares, they lose market share. But if they match New Entrants' low fares, they are accused of setting fares below costs.

American and Northwest did not create low cost subsidiaries. However as the industry deteriorated after the 9/11 terrorist attacks and the recession of 2001, Northwest and American informed investors that they would consider the

strategy. To date, neither airline has a low-cost subsidiary. Instead both appear to be pursuing bankruptcy, merger, and/or alliance strategies.

Crisis: Competition and Cooperation

Commuters, regionals, nationals, former intrastates, and New Entrants either cooperated or competed with Incumbents. Most national carriers, such as Alaska, Frontier Airlines, Midway Airlines, Southwest, and Texas Air, chose to compete while smaller airlines, like Nashville Eagle, Atlantic Southeast, and Comair, chose to cooperate (See Appendix D). In an example of this cooperate or compete relationship, Pacific Express declined to enter into a feeder agreement with United. In response, United expanded its flights on routes flown by Pacific Express and began new routes in which the two companies had previously not competed. Pacific Express sued United in *Pacific Express v. United Airlines*, 959 F. 2d 814 (9th Cir. 1992) on the grounds that United caused Pacific Express losses due to below-cost pricing (*U.S. v. American et al. "U.S. V. Amr corp. Et al,"* 2000). The court ruled that Pacific Express suffered only from increased competition, where it had previously cooperated.

Crisis: Technological Innovation and the Regional Jet

Changes in technology in this period began to allow new regional jets to fly longer distances and become more cost effective, by leveraging lower fuel costs, maximizing passenger load, utilizing less expensive airplanes, and hiring lower seniority pilots. As New Entrants and other competitors began to use these

new regional jets, Incumbents' pilots feared regionals would eliminate their role on intermediate routes and use fewer crew members at lower pay. All of the pilot contracts that the Incumbents held (and still hold), except for Continental, had restrictions on the size, number, or distance that feeder airlines could fly in bringing passengers to Hub and Spokes. The Incumbents', limited by their labor agreements, increasingly relied upon feeder airlines using these regional jets to increase market share, vertically integrate, and avoid conflicts with their pilots unions. However, problems developed when the chosen feeder airline went bankrupt as Mesaba Airlines, a Northwest feeder airline did, or when it became a competitor as Atlantic Coast Airlines, a Delta and United feeder airline, did, changing its name to Independence Air (US GAO, 2004). Independence Air ultimately failed, at which point it asked to become a feeder airline to United, which United declined. Labor relationships at a feeder airline do affect Incumbents. For example, Comair's pilot dispute disrupted Delta's schedules. These relationships also affect the Incumbent's relations with their own pilots. These considerations are secondary, however to the financial incentives involved. By 1997, 50 of the largest regionals carried 65.6 million passengers, and 95% of those passengers were on a regional airline with a code sharing alliance (House Committee *The state of competition in the airline industry*, 1998).

Crisis: Alliances and Mergers

DOT (House Committee *The state of competition in the airline industry*, 1998) defined an alliance as an agreement between two or more airlines that

ranged from an interline agreement (with formulas to split costs and revenues), code sharing, or franchising, to a full merger.

In the code sharing form of an alliance, a smaller airline operates under a Incumbent's code and their flights are booked as such in the CRS. This allows the smaller airline and the Incumbent to take advantage of coordinated passenger and baggage check-in, schedules, standards of services, and FFPs. At higher levels of integration, code sharing alliances include using each other's codes, selling each other's seats, blocked-space arrangements, and TACOs. Airlines can use other CRS follow-on innovations to increase control over feeder traffic while minimizing their investment in assets (Standard & Poor's, 1999b) (see Section 2).

In the franchise arrangement, which is more common in Europe than the US, an Incumbent licenses its name to a small operator, which flies its own airplane with the Incumbent's colors, while remaining an independent entity. Another variant is a "wet lease" arrangement, in which an Incumbent leases an airplane from a supplier with a full crew that operates on a route that the Incumbent cannot or does not choose to operate directly. Once traffic increases or a new route has been developed to a certain level, the Incumbent can substitute service using its own airplane and crew (Standard & Poor's, 1999b). DOT described the most integrated alliances as "... 'virtual' mergers of ... partners, including a degree of common ownership; coordination of pricing, standardization of equipment, services, and supplies;... sharing of frequent flier

programs; revenue and profit sharing; and for some international alliances, immunity from antitrust laws” (House Committee *The state of competition in the airline industry*, 1998, p. 2).

Alliances spread to foreign carriers to manage prohibitions against foreign ownership of US airlines and bi-lateral country agreements. Western European countries have slowly “liberalized” their aviation laws to allow for “partial deregulation,” but within the broader EU framework. The US has Open Skies agreements with Canada and Western Europe that replace bi-lateral country agreements. Due to ownership and country restrictions, alliances between Incumbents and foreign airlines have become the primary means to extend travel beyond US borders, much as Incumbents extended their routes through small feeder airlines. United led the movement in international alliances by associating with British Airways in 1987. While this alliance did not last, United later created Star Alliance with Lufthansa (see Appendix F). As the first foreign alliance, United - Lufthansa required antitrust exemption, as did other alliances, such as the alliance of Scandinavian Airlines (SAS) with Continental. American and British Airways sought a comprehensive alliance from 1996 to 2002, but failed to obtain regulatory approval, and now have a code-sharing alliance through American’s oneworld. American and British Airways are attempting an alliance for the third time in 2008, on the heels of the merger of Delta and Northwest. Delta formed the SkyTeam alliance with Swiss Air, Austrian Airlines, Alitalia, and Sabena, but later lost Austrian Airlines to Star Alliance and had to ask Alitalia to leave when it

could not maintain schedules at Milan. Continental, later joined by Northwest and KLM Royal Dutch Airlines (KLM) (which operated a merger-like alliance), formed Wings. Wings was unable to compete when it lost its only strong European partner, KLM, when KLM merged with Air France. Continental and Northwest ultimately joined Delta's SkyTeam. In 2004 United's Star Alliance had a 22% market share of global industry capacity, Delta's SkyTeam had 19%, and American's oneworld had 15% (Standard & Poor's, 2005). Continental is to join United's Star Alliance, subject to regulatory approval (Maynard, 2008d).

DOT approval is required for all international alliances and has testified that, "Generally we have supported and promoted ... [them and] ... have granted antitrust immunity to international alliances, recognizing that immunity would produce heightened, rather than lessened, consumer benefits in these cases" (House Committee *The state of competition in the airline industry*, 1998, p. 2). Antitrust immunity is based on whether the international partner's home country has signed an Open Skies agreement. The Antitrust Division is consulted by DOT to ensure consistency with antitrust laws and approval is for five-year terms with required renewals. DOT believes "... that linking networks on different continents may allow airlines to create better quality and more competitive service in literally thousands of markets around the globe.... Such alliances are likely to be pro-competitive overall" (House Committee *The state of competition in the airline industry*, 1998, p. 2). Most international alliances are formed by

linking networks and they tend to be more like end-to-end mergers (House Committee *The state of competition in the airline industry*, 1998).

International alliances are very common because they allow airlines to enter a market that is:

1. too expensive to serve with their own staff, airplanes, airport real estate, equipment, and infrastructure;
2. restricted by bi-lateral country agreements;
3. too small to support head-to-head alliance competition, whereas an alliance member's overall network size and city presence may be more advantageous (US GAO, 1999b);
4. used to stimulate traffic in Hub and Spoke networks;
5. used to lower costs and fares, and increase flight frequencies; and
6. used to share cost in cargo and passenger airport real estate, integrate FFPs, consolidate sales and advertising, maintenance, administrative operations, information technology, and joint procurement (Standard & Poor's, 2000).

Most international alliances are primarily structured so that partners are independent entities with coordinated schedules and FFPs (Standard & Poor's, 2000). The exceptions have been US Airways – British Airways and Continental – SAS. There were 71 international code-sharing alliances approved by DOT some of which may have expired (House Committee *The state of competition in the airline industry*, 1998).

Finally, Incumbents formed alliances with other Incumbents, representing another industry consolidation. After the last wave of mergers in the mid to late 1980s, there were very few Incumbents left except financially weak airlines (e.g., TWA). In 1994, Continental and America West formed the first wide-scale domestic alliance with code sharing, FFPs, coordination of connecting services, and limited, but non-controlling common ownership (House Committee *The state of competition in the airline industry*, 1998). However, that relationship was cancelled in 2002 when a fare war broke out between America West and the Incumbents, including Continental (Trottman, 2002). Northwest and Alaska Airlines entered into similar alliance but without equity ownership in 1998. As the 2008 recession worsens and fuel prices remain high, Continental and United are seeking an alliance, subject to antitrust approval (Maynard, 2008d).

Northwest's 12.7% ownership/alliance with Continental in 1998 required DOJ antitrust approval. Once Northwest - Continental announced their alliance, other Incumbents followed: American - US Airways and United - Delta. These three alliances represented almost 70% of the domestic airline traffic and raised antitrust issues, particularly at hubs. While alliances raise antitrust issues, it is not at the same level of scrutiny as mergers. The proposed American - US Airways and United - Delta alliances failed, but they later formed looser alliances with code sharing, FFPs, and some joint marketing (House Committee *The state of competition in the airline industry*, 1998). Later proposed combinations of United - US Airways failed, but successful mergers of American - TWA in 2000 and

America West – US Airways in 2006 succeeded based on the CAB principle of mergers of financially weak companies. In 2006, United and Continental explored a possible alliance. In the same year, US Airways, now part of America West, attempted an unfriendly takeover of Delta as Delta prepared to exit bankruptcy (Sorkin & Bailey, 2006). Delta is merging with Northwest and United is partnering with Continental (Bailey, 2007b; Maynard, 2008d; Sorkin & Bailey, 2008).

Alliances with other airlines are a strategy to quickly and efficiently add market share and “spokes” to an Incumbent’s hub without sizeable sunk costs. Alliances also avoid significant costs such as debt in a time of tight credit, merging seniority lists for pilots, merging CRSs, etc. Consumers are satisfied with alliances because they provide “seamless travel” provided by a “single” airline, with check-in, baggage handling, ticketing, FFPs, shared airport lounges, and fare sharing that often is cheaper than buying tickets from each separate alliance member (US GAO, 1999b). Thus, we see Incumbents coordinating with regionals to increase hub density traffic. This is highly profitable for all airlines and some Incumbents continue to purchase feeder airlines subject to pilots’ contracts. International alliances represent a similar strategy. Alliances allow Incumbents to bypass bi-lateral country agreements, prohibitions of foreign ownership of US airlines, and large start-up costs. Incumbent-to-Incumbent alliances are the next step in industry consolidation: a way to increase market share, obtain coverage in parts of the country where they have none, and avoid some antitrust issues that mergers precipitate. These alliances provide

Incumbents with increased density feed on Hub and Spokes, larger market shares, higher barriers, and above industry rents.

Détente and Abandonment

While the government decried the increasing market shares and above industry rents, Standard & Poor's analyst Stephen Klein reported the best profit margins in decades,

The battle to dominate hub airports, however, has given way to détente. Carriers now respect the hegemony each enjoys at three to four hubs. This cozy peace has improved load factors, stabilized airfares, and contributed to the industry's ... [largest] profit margins in decades (Standard & Poor's, 1998, p. 10).

This détente or mutual forbearance exists not only among Incumbents, but also between Incumbents and Southwest as will be more fully discussed in Chapter 7. However, détente has not lasted long with the entry of JetBlue in 2000 and Virgin America in 2007 who impact long-distance markets and put downward pressure on fares. Incumbents have reacted to declining revenues and increased costs, particularly fuel costs, by moving to international markets that are still somewhat price controlled (while European Union countries are moving to a deregulated airline industry model, Asian countries and a number of other countries still retain fixed prices), and decreasing domestic operations using smaller regional jets to move passengers to their hubs (2007b, 2007d). Low cost airlines now account for 35% of the domestic passenger market (see Figure 14).

Conclusion

This chapter primarily covers the development of the hub and spoke as a means by which Incumbents were able to repel New Entrants, control markets, and gain above industry rents. A number of crises in the early Deregulation era led to its rapid diffusion among Incumbents, including financial pressures, the DC-10 grounding, intense competition from New Entrants and Incumbents, battles over slots at National Airport, and the PATCO strike. The PATCO strike and slot controls showed Incumbents that limited entry, caused by government restrictions at the largest airports, gave Incumbents at those airports a significant barrier from competition. Mergers, bankruptcies, and a lenient DOT allowed Incumbents to build even more substantial hub barriers and enjoy significant premiums. Incumbents also used CRS and its follow-on innovations, feeder airlines, alliances, predation, and détente to further extend their market control of hubs. By the early 1990s, however, the strength of Southwest and other New Entrants, and government actions to eliminate hub barriers caused the gradual decline of Incumbents at key hubs, leading eventually to the retreat of most Incumbents from domestic markets to international markets. The next chapter will cover the rise of the New Entrants as they overcame hub barriers put in place by Incumbents and the return of the Point-to-Point network.

Endnotes

1. Size of airport was based on total annual national enplanements: large hubs enplane 1% or more passengers, medium hubs enplane 0.25% to less than 1% of passengers, small hubs enplane 0.05% to less than 0.25% of passengers (US GAO, 1990a), non-hub airports enplane more than 10,000 passengers, but less than 0.05% of passengers, and non-hub, non-primary airports enplane at least 2,500 passengers, but not more than 10,000 passengers (US FAA, 2007b).
2. The original five slot-controlled airports were Chicago's O'Hare Airport, Washington, DC's National Airport, and NY/NJ's La Guardia Airport, JFK Airport, and Newark Airport. Newark Airport was removed from slot-control status in 1970, but reinstated in 2008.
3. Perimeter rules currently are in place at La Guardia Airport (1,500 miles maximum distance allowed for an airplane to travel), National Airport (1,250 miles maximum distance), and Love Field Airport (airplanes carrying more than 56 passengers to and from Love Field Airport must stop at an airport in Alabama, Arkansas, Kansas, Louisiana, Mississippi, New Mexico, or Oklahoma before proceeding elsewhere or flying to Love Field Airport).
4. Hub size varied over the years, particularly for small and medium hubs. For example, Detroit Airport was a small hub in 1988, but was classified as a large hub in 2007 (US DOT, 2007).

5. The temporary subsidies to protect small communities from losing commercial air service post-Deregulation became a permanent program called the Essential Air Service Program (EASP).
6. Based on 1988 data, the GAO (1990a) created a comparison group of 38 unconcentrated airports, which were Albuquerque, Austin, Birmingham, Boston, Buffalo, Cleveland, Columbus, El Paso, Ft. Lauderdale, Ft. Myers, Hartford, Indianapolis, Jacksonville, Kansas City, Las Vegas, Little Rock, Louisville, Miami, Milwaukee, New Orleans, Norfolk/VA Beach, Oklahoma City, Omaha, Orlando, Philadelphia, Phoenix, Portland, Reno, Richmond, Rochester, Sacramento, San Antonio, San Diego, Seattle, Tampa, Tucson, Tulsa, and W. Palm Beach.

CHAPTER 7

NEW ENTRANTS, NEW STRATEGIES

The most significant development post-Deregulation was the emergence of Point-to-Point airlines (Standard & Poor's, 1981b). Point-to-Point route service is between a pair or several pairs of cities (points), without the complex Hub and Spoke route network developed by Incumbents (see Chapter 6). If a passenger wished to fly from the West Coast to the East Coast, for example, they would have to fly from Los Angeles to Phoenix to Chicago and then to Boston. Prior to Deregulation, the industry primarily flew Point-to-Point, except for Delta, which used the Hub and Spoke. After United's strategic use of the Hub and Spoke as a radical innovation post-Deregulation, most Incumbents followed suit. Most New Entrants continue to use the Point-to-Point system and were called at various times point-to-point airlines, low cost carriers, local service airlines, or commuter airlines. These New Entrants emulated the successful low-fare, fast-turnaround services introduced by Southwest and Pacific Southwest Airlines (PSA) in their intrastate operations. Their success was the basis for regulators considering Deregulation. The latter two airlines extended service to interstate routes in 1979.

One of the goals of Deregulation was to allow New Entrants into the industry, who were presumed to bring innovation, lower fares, more choices, and better service with them. As seen in Chapter 6, Incumbents were able to

control large and medium-sized airports and block competitive entry with Hub and Spoke follow-on innovations. Chapter 8 discusses the government's efforts to increase New Entrants' presence at key airports. As will be shown there, the outcome was less than successful at best, and at worse, had the unintended consequence of increasing Incumbents' control. This chapter will describe how New Entrants established a presence in key markets despite Incumbents' usage of the Hub and Spoke to shut them out.

1968 – 1977: Southwest Airlines in the Era before Deregulation

Since Southwest has become the leading example of the successful New Entrant, it is helpful to discuss the airline's development from an intrastate to an interstate airline and the crises it faced in that effort.

Crisis: Litigation

For the first four years that Southwest was in existence, it was unable to fly due to litigation by CAB certificated¹ airlines Braniff and Trans Texas (later named Texas International, a future subsidiary of Texas Air) (Knorr & Arndt, 2005). In a countersuit, Braniff and Texas International were found guilty of conspiracy to drive Southwest out of business (Aviation Week & Space Technology, 1977a). Southwest also faced litigation from Dallas Airport authorities, the Cities of Dallas and Ft. Worth, the local community, and other airline competitors. The primary cause of the ongoing litigation was the fact that Love Field Airport, which Southwest had chosen as its headquarters and hub,

was to be replaced by newer, larger Dallas Airport. Love Field Airport was to be phased out of operation. Southwest wanted to operate its Texas intrastate airline business between Love Field Airport and William Hobby Airport (Houston Hobby Airport). Southwest was sued by the following entities for the associated reasons:

1. Dallas Airport authorities and the cities of Dallas and Ft. Worth claimed that they would be economically harmed if Love Field Airport was not closed to New Entrants and all air service moved to Dallas Airport (see Chapter 8 and Appendix C). These entities had already paid for the construction of the new airport, moved most airlines from Love Field Airport, and negotiated with American to relocate their headquarters from New York City. The Cities of Dallas and Ft. Worth's efforts were similar to those of other cities who relocated major airport operations to newer, larger airports (e.g., Chicago's Midway Airport to O'Hare Airport; New York City's La Guardia Airport to JFK Airport; and Washington, DC's National Airport to Dulles Airport).
2. The relocated airlines who had paid for the cost of Dallas Airport through general airport revenue bonds (GARBs) and other fees also sued on the grounds of economic harm. These relocated airlines had to pay for the higher cost of Dallas Airport through GARBs, while Love Field Airport, an older airport that was to be decommissioned, had lower fees. Thus, the airlines were competitively disadvantaged by costs.

Additionally, as with most newer airports, Dallas Airport was located further from the city of Dallas, the major city, while Love Field Airport was closer. So the second advantage over Dallas Airport was distance. Thirdly, the relocated airlines had not been given a choice to relocate or stay.

3. Neighbors of Love Field Airport litigated against continued use of Love Field Airport due to noise and environmental concerns. The Cities of Dallas and Ft. Worth and the Dallas Airport authorities had sold the new Dallas Airport to the voters and public as a means of reducing the environmental and noise problems at Love Field Airport.

The litigants lost all court actions, including a review by the US Supreme Court. In the City of Dallas v. Southwest Airlines Co. (371 F. Supp 1015 (N.D. TX) 1973; affirmed 494 F.2d 773 (5th Cir), cert. denied 419 US 1079) (1974; 371 F. Supp. 1015, 1030) the courts found that the Cities of Dallas and Ft. Worth unreasonably and with unjust discrimination denied Southwest access to Love Field Airport while other airlines of similar size and function were allowed to use the facility. This discrimination was objectionable because of the anticompetitive effect it had on the airlines and the public they serve (US FAA/OST, 1999a). The FAA issued orders stemming from the Love Field Airport litigation and ruled that manipulation of airport standards solely to protect the interest of an Incumbent is unacceptable (FAA Order 5190.1A (1985)). The FAA (FAA Order (5190.6A, ¶ 3-12)) and the courts (Love Field

Service Interpretation, *supra*, n 4) ruled that airport authorities may not justify restrictions on New Entrant's access based on potential economic harm to another airport. Another basis for ruling in favor of Southwest was that the airline was governed by the Texas Aeronautics Commission (TAC) and not CAB (Aviation Week & Space Technology, 1979e). The TAC may make different rulings that were more flexible and less prone to review and litigation than CAB-certificated airlines and CAB. In fact, it was this very flexibility of TAC and Southwest, and the California Public Utilities Commission and PSA that attracted CAB and made Congress pass the Deregulation Act.

As a result of its litigious history,

Its founder and chairman, Herbert D. Kelleher, developed a mighty chip on his shoulder in the 1970s, as other airlines tried to drive the upstart Southwest out of business. Mr. Kelleher... channeled that, creating an us-against-them attitude that somehow made it seem fun to work harder than other airlines (Bailey, 2008, p. C10).

Crisis: Lack of Airplanes

As a result of the continuing litigation, Southwest found itself in a Catch-22: it didn't have enough traffic to fill all of the planes it owned, so it had to return its fourth Boeing 737 because expected traffic had not developed as forecast. At the same time, three Boeing 737s were insufficient. M. Lamar Muse, President of Southwest, blamed "...stiff competition and nearly perpetual litigation over operating rights since the airline began flight operations in 1971 and the three years before that over the granting of operating authority by the Texas Aeronautics Commission" (Aviation Week & Space Technology, 1976b,

pp. 40-41). Management met with its pilots and ground crew to see if they could maintain existing schedules with just three airplanes. To make best use of their airplanes, Southwest increased its average airplane utilization to 7.5 hours per day, higher than other CAB-certificated airlines (Aviation Week & Space Technology, 1976b). High airplane utilization with Southwest's renowned "10-minute turnaround" of airplanes became one of the cornerstones of Southwest's low cost provider strategy. The higher the utilization rate of this expensive capital item, the greater the return to investors, and the lower the cost of capital as well as operating costs. As Southwest told its stockholders, "It's interesting to note that if this 10 minutes were expanded to 20, it would cost us in 1979 the equivalent of two more Boeing 737's to fly the same number of flights" (Southwest Airlines, 1978, p. 3).

Subsequently, Southwest increased average airplane utilization to more than ten hours per day in 1978 (Southwest Airlines, 1978) and to eleven hours per day in 1979 (Southwest Airlines, 1979). Confronted with a crisis, Southwest had responded with a follow-on innovation: the 10-minute turnaround and high airplane utilization. Competitors, both New Entrants and Incumbents, were unable to increase their airplane utilization to the same levels, partially because of their reliance on the Hub and Spoke instead of the Point-to-Point system which Southwest uses. Under the Hub and Spoke, airplanes arrive at a Hub to deplane passengers and enplane passengers to their next destinations. Thus large numbers of airplanes wait for the last airplane to arrive in order to

coordinate schedules and move passengers and baggage in as short of a time period as possible. This complex coordination of airplanes and services makes the Hub and Spoke more sensitive to delays due to weather, mechanical failures, and other disruptions. The longer the coordination period, the longer the airplanes wait on the tarmac and the lower the utilization rate. In contrast, under the Point-to-Point system, planes do not have to wait and coordinate their schedules with banks of other airplanes. Each airplane arrives, deplanes, and leaves for its next destination. Coordination and movement of airplanes, passengers, and baggage are not as critical for Point-to-Point, airplane utilization rates can be higher and costs lower, a critical competitive advantage in a financially constrained industry.

Crisis: Growth Limits

Southwest, an intrastate airline, avoided CAB's authority telling its stockholders it "... did not wish to become ... a CAB air carrier because ... the added burdens of federal regulation were not recompensed by adequate... opportunity ..." (Southwest Airlines, 1978, p. 2). However, by 1976 Southwest realized it had to expand beyond Texas to continue to grow and applied to CAB for Midway Airport routes through a new subsidiary, Midway (Southwest) Airway Co. (Midway-Southwest).

This interstate move highlighted three Southwest strategies:

1. Midway-Southwest would be subject to CAB authority while Southwest would remain under TAC authority.

2. Southwest relied on "... satellite airports located substantially closer to downtown business centers than the major airports serving these cities" (Southwest Airlines, 1980, p. 6). Midway-Southwest was to fly out of older Midway Airport (Southwest Airlines, 1976), which had been replaced by slot-controlled O'Hare Airport. Southwest continued this strategy as it expanded across the nation by selecting satellite airports, such as California's Oakland Airport and Ontario International Airport over more congested San Francisco Airport and Los Angeles International Airport, respectively; New York's Long Island MacArthur Airport over JFK Airport; and Providence Theodore Francis Green State Airport in Rhode Island over Boston Airport. While these latter satellite airports were accessible, lower cost, and less congested, they were not close to downtown.

3. Southwest's satellite airports did not lead to a direct confrontation with Incumbents at key airports. Midway Airport had one Incumbent, Delta, with one flight per day.

Midway-Southwest selected fourteen commuter markets radiating from Midway Airport (Buffalo; Cincinnati, Cleveland, Columbus, Dayton, Des Moines, Detroit, Kansas City, Louisville, Memphis, Minneapolis, Omaha, Pittsburgh, and St. Louis) in a pattern more resembling a Hub and Spoke than a Point-to-Point.

CAB's route application process allowed competitors to apply for identical routes. Midway-Southwest found "... there are now ten carriers who ...

want authority to serve the identical markets ...” (Southwest Airlines, 1976, p. 9). This competitive response was typical in the pre-Deregulation environment. Incumbents watched each others’ competitive moves, defended their markets, and took proactive steps whether they wanted the route award(s) or not. For example, “[s]ome carrier[s]... indicate the Midway proposal could prompt United and Continental [based at O’Hare Airport] ... to launch a head-to-head competitive service to drive ... [Midway-Southwest] out of the [Chicago] market” (Ellingsworth, 1976, p. 26). Midway-Southwest obtained non-exclusive routes between Midway Airport and Cleveland, Detroit, Kansas City, Pittsburgh, St. Louis, and Minneapolis Airports (Southwest Airlines, 1978), less than half the requested routes. The Midway-Southwest CAB application raised two issues that later defined competition under Deregulation: Incumbents versus New Entrants and Hub and Spoke versus Point-to-Point.

1978 – 2008: Southwest, Deregulation, and New Markets

Southwest and PSA were models for the Deregulation Act of 1978 and both entered the interstate market under CAB authority in 1979. PSA merged with US Airways in 1987, but Southwest continues as the largest US airline of domestic passengers (US DOT Bureau of Transportation Statistics, 2007). Considering the current failure rate of New Entrants is 94% (Sinha, 2001) this section studies the role of the Hub and Spoke and Point-to-Point route networks on their success and failure.

Crisis: Deregulation

With Deregulation's passage, Southwest changed its strategy, left its Midway-Southwest subsidiary and routes dormant, and told its stockholders,

Analysis ... of the Deregulation Act has caused Southwest to change its views of CAB regulation. The prime attractions are the emphasis ... upon freedom of competition ... and the provision ... for obtaining new routes ... opportunities for new routes will... present themselves and give us the potential for strong future growth... (Southwest Airlines, 1978, pp. 3-4).

In Southwest's application for route authority from Houston Hobby Airport to New Orleans International Airport (New Orleans Airport) (Aviation Week & Space Technology, 1979e) Southwest sought to replicate its Midway-Southwest strategy and give CAB authority over its interstate routes only. CAB, however, took the position that its authority "... gives it plenary jurisdiction to regulate Southwest's entire system" (Southwest Airlines, 1978, p. 4). CAB did agree to not require Southwest to interline passengers nor offer joint fares with other airlines, "... permitting us to continue to operate in our accustomed intrastate mode as primarily a low fare, point-to-point, commuter airline specialist" (Southwest Airlines, 1979, p. 3). Southwest maintained its Point-to-Point route network and independence, but now focused its efforts on ensuring its routes were grandfathered under CAB:

Under the ... Airline Deregulation Act of 1978, the preexisting authority granted Southwest by the Texas Aeronautics Commission to serve Texas routes (including Love Field and Hobby) is now part of its Federal authority ... Southwest believes that it is not required to file any application with the CAB for further authority to continue service inaugurated under the Texas Aeronautic Commission certificates (Southwest Airlines, 1978, p. 4).

CAB granted Southwest route authority to fly between Love Field Airport and New Orleans Airport only to have the route award appealed to the District of Columbia Circuit Court by Dallas Airport authorities, the Cities of Dallas and Ft. Worth, the local community, and competitors (Southwest Airlines, 1979). In 1980 Southwest accepted the Wright Act ("Wright Act," 1980) that affirmed Southwest's right to use Love Field Airport within Texas and to fly to four adjacent states:

... the Company believes that its becoming subject to CAB ... and receiving a final CAB certificate authorizing the use of Love Field in connections with intra-Texas service, plus enactment of the described legislation, establishes, as a matter of federal law, the Company's right to use Love Field ... After several months of battle in the Congress, we reluctantly accepted the Love Field compromise as the best obtainable under the prevailing political circumstances ... we expect that the extremely heavy expenses, in time and money, incurred during the past seven years in order to assert and defend that right will cease (Southwest Airlines, 1979, p. 3).

Love Field Airport is perimeter-controlled by the Wright Act for interstate flights between four adjacent states: Arkansas, Louisiana, Oklahoma, and New Mexico. This means any flights that originate from Love Field Airport must first stop at one of the adjacent states before it can fly to a further destination. For example, if a passenger flying from Dallas to Los Angeles on Southwest, would board an airplane at Love Field Airport and fly to Albuquerque, New Mexico, then change airplanes, to continue the trip to Los Angeles. Conversely, a passenger flying on Southwest from Chicago's Midway Airport to Love Field Airport, would first stop at New Orleans Airport and change airplanes.

Other perimeter controlled airports are controlled by flight-distance. The purpose of this rule is to encourage short-distance flights to one airport (i.e., National and La Guardia Airports) and long-distance flights to another, nearby airport (i.e., Dulles and JFK Airports). Flights to and from National Airport must depart and land within a radius of 1,250 miles and flights to and from La Guardia Airport are limited to a radius of 1,500 miles. This perimeter-control effectively limits National and La Guardia Airports to other airports located on the eastern seaboard and in parts of the Midwest and South.

It should be noted that the perimeter laws affecting Love Field Airport are substantially different from those affecting La Guardia and National Airports (see Chapter 8). The latter were slot-controlled by the FAA's High Density Rule of 1969 due to airport congestion and the airports' locations in dense urban areas. The purpose of this rule is to allow airport authorities to develop and encourage long-distance flights at specified airports and improve overall air transportation system capacity. National Airport's perimeter and number of flights were also legislated by the Metropolitan Washington Airports Act ("The metropolitan washington airports act of 1986," 1986a). Unlike La Guardia and National Airports, Dallas and Love Field Airports are not in densely populated areas that are congested nor are they under a single airport authority. Upon approval of the Wright Act, Southwest emphasized interstate service from Houston Hobby Airport to avoid the perimeter-controls at Love Field Airport (Southwest Airlines, 1979).

The Shelby Amendment Territory ("Shelby amendment territory," 1997) expanded the perimeter states to include Alabama, Kansas, and Mississippi. Lawsuits such as *American Airlines, Inc. v. U.S. Department of Transportation* ("*American Airlines, Inc. V. U.S. Dept of Transportation*," 2000) continued to impose Love Field Airport restrictions, which DOT found to be inconsistent with the Shelby Amendment and

... constitute an impermissible regulation of airline rights ... [and] inconsistent with the purpose of the Deregulation Act, which is intended to benefit the public by providing airlines with the freedom to choose which markets they will serve in response to market demands (US FAA/OST, 1999a, p. 23).

American lost its case against the US DOT (*American Airlines, Inc. v. U.S. DOT*, "*American Airlines, Inc. V. U.S. Dept of Transportation*," 2000) when the 5th Circuit Court of Appeals ruled that any airline could offer service to any city from Love Field Airport in airplanes carrying 56 passengers or fewer. Since Southwest only has a fleet of B-737s that carry over 130 passengers, Southwest did not qualify for this exemption.

Southwest has been trying to modify the Wright Act since 2004 and fly beyond the perimeter states from Love Field Airport using its B-737s (Associated Press, 2006). Currently, if Dallas-based passengers want to fly long distances, they use either Dallas Airport, or fly from Love Field Airport to Houston Hobby Airport or one of the approved perimeter states, and then to their ultimate destination. American, the Dominant Airline at Dallas Airport has proposed a compromise between its interests and those of Southwest: eight additional years of perimeter controls, 16 more gates for Southwest at Love

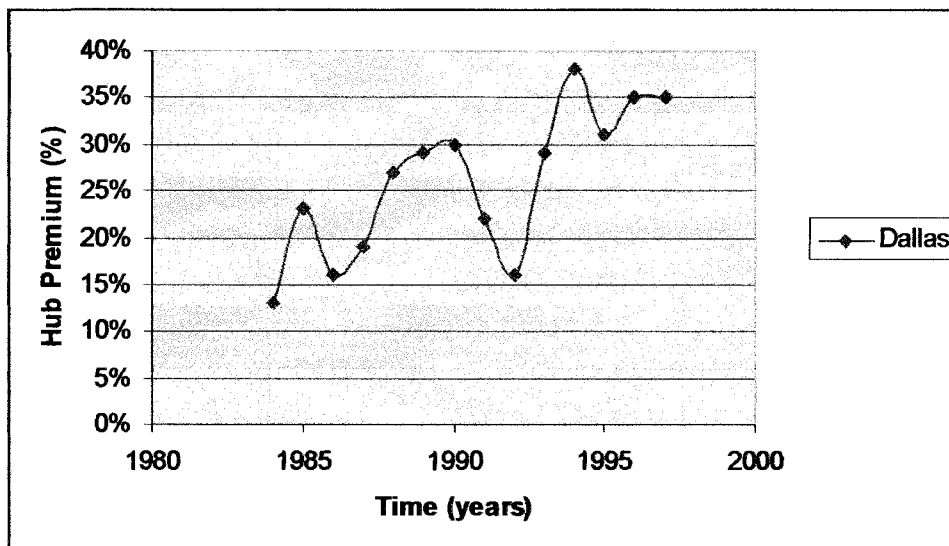
Field Airport and a new main terminal building for the Love Field Airport (Associated Press, 2006). The proposed legislation, however, is opposed by several important members of the Texas Congressional delegation (Associated Press, 2006).

American at Dallas Airport and Southwest at Love Field Airport

This section will review the effects of American's control of Dallas Airport, the perimeter controls at Love Field Airport, and the relationship between American and Southwest in the Dallas market. Just as Dallas Airport is not classified as a Concentrated Airport by GAO despite American's 79.5% market share in 2000, Love Field Airport is similarly not classified despite Southwest's almost 100% market share (Senate Committee, *Aviation competition: Challenges in enhancing competition in dominated markets*, 2001; US GAO, 1990a). The GAO (1993) also excluded Baltimore, Houston Hobby, Houston Intercontinental, JFK, La Guardia, Los Angeles area, Midway, O'Hare, and San Francisco Airports from their classification of Concentrated Airports. GAO's reasoning being that passengers can go to a nearby airport should the Dominant Airline charge above industry rents.

Dallas Airport is the hub and headquarters for American and has been since the airport opened in 1978 (American Airlines, 1978). American's market share of enplanements at Dallas Airport was 65.7% in 1979, 68.3% in 1984, and 79% in 1988. American had few strong competitors: Braniff went bankrupt

Figure 29
American's Hub Premium at Dallas Airport: 1984 – 1997



Note: The data are from S. Borenstein's presentation to the Transportation Research Board Study Committee on Airline Competition, Jan. 1999, Table 2, and referenced in *Predatory Practices in the U.S. Airline Industry*, by C. Oster, Jr., and J. Strong, 2001, Bloomington, IN: Indiana University, Table 6 and Appendix B.

in 1982, Continental in 1983 and again in 1991, and Texas Air, with subsidiaries Continental, Eastern, and Texas International, in 1994. American's market share of enplanements increased to 79.5% in 1999/2000. Delta did enter Dallas Airport but left while in bankruptcy in 2005. American's primary competitor in the Dallas area is Southwest, at perimeter-controlled Love Field Airport.

Figure 29 shows American's hub premium at Dallas Airport, never less than 13%. The decline in hub premiums in 1985 reflected an overall industry decline in fares due to fare wars, particularly as Continental and its parent,

Texas Air, aggressively sought market share. The increase in hub premiums from 1988 to 1990 was part of an effort by Incumbents to use CRSs to signal fares and increase ticket prices (U.S. v. Airline Tariff Publishing Co. et al, "U.S. V. Airline tariff publishing co, Alaska Airlines, American airlines, Continental Airlines, Delta air lines, Northwest airlines, trans world airlines, united air lines, and usair," 1992) (see Chapter 6). DOJ officials found more than 50 separate incidents of price fixing, including Chicago to Dallas routes, that raised fares by as much as \$138 (Sanchez, 1994). The next decline in hub premium reflects the 1990 - 1991 recession, with a rebound in hub premiums when Continental and Texas Air declared bankruptcy.

In this time frame, American had 91% of all the Dallas-area Agents on its CRS (US GAO, 1990a) providing American with above industry rents (see Section 2). While the courts found American's vigorous competition against New Entrants at Dallas Airport to not be anticompetitive, American's behavior undoubtedly made New Entrants reluctant to enter Dallas Airport (see Chapter 8). New Entrants expressed concerns about entering both Dallas and Love Field Airports due to vigorous competition by American and Southwest (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000).

Dallas Airport has 112 exclusive-use gates under a lease expiring in 2009 and 8 airport controlled gates (see Appendix G). Dallas Airport authorities do not limit sublease charges to New Entrants (US FAA/OST, 1999a) but gates and ticket counters are readily available to New Entrants. Dallas Airport

authorities also run a program to cooperatively advertise New Entrants (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000). Airport authorities do use Passenger Facility Charges (PFCs) for capital improvements, including airfield projects, though other airlines at Dallas Airport protested PFC usage when they believed that the improvements would benefit one airline (US FAA/OST, 1999a). Dallas Airport authorities claimed to need the PFCs as a stable and adequate funding source to ensure it could build its needed infrastructure (US FAA/OST, 1999a). PFCs will be covered in more detail in Chapter 9.

Détente at Dallas and Love Field Airports

Southwest and American competed in the Dallas area since the 1970s, with Southwest's cost and fares significantly below American's. "American had long pursued a strategy of co-existence with Southwest ... focusing on flow traffic (i.e., medium to long-haul) ... and premium passengers and leaving short-haul ... to Southwest" (Knorr & Arndt, 2005, p. 162). In 1993 "when Southwest decided to enter California, American immediately scaled down its local short-haul operations to avoid a direct confrontation" (Knorr & Arndt, 2005, p. 162). For many years, American provided Southwest with free access to its CRS (see Section 3). Professor Berry, a DOJ expert witness, calculated that on non-stop routes from the Dallas area without Southwest or a low cost carrier as a competitor, American earned a price-cost margin of 44.3% in 1994, 46.6% in 1996, and 50.7% in 1998 (U.S. v. American et al. "U.S. V. Amr corp. Et al,"

2000). On all non-stop routes that Southwest or a low cost carrier did compete out of the Dallas area, Professor Berry calculated American's price-cost margin was 9.7% in 1994, 19.1% in 1996, and 20.5% in 1998 (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000), significantly lower profits. American reduced its jet capacity on competing Southwest routes from Dallas Airport by 25.7% from May 1995 to May 1996 (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000). Professor Berry concluded, "... [a Dallas Airport] monopolist facing strong pricing competition from Love Field would find it difficult to raise prices substantially above the competitive level" (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000, p. 122).

While many New Entrants, such as Access Air, Legend Airlines, and Sun Jet International (Sun Jet), developed strategies to avoid American at Dallas Airport, Southwest chose to ignore most competitors. When American entered Love Field Airport in the second quarter of 1998 at a fare of \$53 versus Southwest's fare of \$69, Southwest maintained its average fare at \$68 through the third quarter of 1999 and did not appear to respond to American's entry (Oster & Strong, 2001). American raised its fare to \$65 and Southwest's traffic declined 17%, but Southwest still carried more than two and a half times American's traffic (Oster & Strong, 2001). While American and Southwest developed a pattern of détente, they to this day use litigation and political power to maintain or argue for the repeal of the Wright Act of 1980, a formidable competitive barrier against Southwest.

Crisis: Southwest as a Monopolist

A dramatic change in the airline industry reported by Bennett and Craun (US DOT, 1993) was Southwest's influence on prices in short-distance markets after 1991. For example, the industry made a profit of \$1.77 billion in 1988 because Incumbents increased fares in short-distance markets. If Southwest's impact on short-distance fares was removed, industry revenues would have been \$2.5 to \$3 billion higher (US DOT, 1993). As reported in a study by Clifford Winston, an airline economist at the Brookings Institute, consumers would have lost \$19.6 billion in the form of higher air fares and less frequent service if Southwest did not exist in 2000, as shown in Table 24 (Bailey, 2006b). In contrast, Continental, US Airways, and American, the airlines charging the highest fares, cause consumers to pay more due to a lack of a low-cost competition.

When Southwest enters a market it often causes Incumbent's revenues to decline by half despite greater traffic, what DOT called the "Southwest effect" (US DOT, 1993). Bennett and Craun concluded the industry's profitability picture was impacted by,

... long-haul prices that are perhaps too low in relation to cost because they are so competitive, and ... short-haul prices that are too low because of ... Southwest. Given these constraints, it would appear that in order to return to profitability the other major airlines... must increase their long-haul prices, and reduce their short-haul costs (US DOT, 1993, p. 6).

Table 24
Airlines' Impact on Industry Fares: 2000

Airline	Impact on Industry Fares (\$ billion)	Comments
Southwest	\$19.6 cost savings for consumers	Low cost New Entrant
ATA	\$7.8	Low cost New Entrant; two bankruptcies
United	\$7.2	Emerged from bankruptcy
Delta	\$6.1	Emerged from bankruptcy; merged with Northwest
AirTran	\$5.5	Low cost New Entrant; merged with bankrupt ValuJet
JetBlue	\$5.5	Low cost New Entrant; needed cash and sold 19.8% ownership to Lufthansa
Northwest	\$1.0	Emerged from bankruptcy; merged with Delta
Continental	(\$2.4) loss for consumers	Emerged from bankruptcy twice
US Airways	(\$3.6)	Emerged from bankruptcy twice; merged with America West, a low cost New Entrant who also emerged from bankruptcy
American	(\$3.7)	

Note: The data are by Clifford Winston, in "Pairing Up Aloft," by J. Bailey, Dec. 14, 2006, *The New York Times*, p. C4. Comments are those of author.

Bennett and Craun further concluded that Incumbents were unable to compete against Southwest's lower costs, and the government needed to encourage other low cost airlines to provide market discipline against Southwest (US DOT, 1993). New Entrant low cost airline America West entered interstate service in the 1980s, declared bankruptcy, and merged with US Airways, which declared bankruptcy twice. Other New Entrant low cost airlines ATA and JetBlue have also run into financial difficulties. Despite the fact that very few New Entrants succeed, Bennett and Craun concluded,

Without a competitive discipline, over time Southwest's fares will increase to cover cost inefficiencies that will creep in, and to extract monopoly profits. We already see Southwest's prices beginning to increase where it has forced out its competitors... In markets dominated by Southwest more effective low-cost competition is needed to keep fares low and to maintain a competitive level of service (US DOT, 1993, p 9).

Incumbents compete in long-distance markets at fares below costs, fares that are unsustainable in the long run. On routes shared with Southwest, Incumbents drop out, or if they continue to compete, they reduce the number of seats allocated to local traffic and dedicate more to flow-through hub traffic. The government has raised concerns that Southwest would become a monopolist, asking, "Whom will discipline the monopolist?" Further, who would replace Incumbents as they lose their hub premiums on short-routes to Southwest and other low cost airlines, and continue to compete at prices too low relative to cost (US DOT, 1993)? Indeed, as a result of the bankruptcies or near-bankruptcies of most Incumbents in the early 2000s, all Incumbents have reduced their labor costs except for Southwest. Southwest now has the highest

industry labor costs and in response recently asked for voluntary retirements in an attempt to reduce costs (Bailey, 2008)(1/13). Due to unprecedented prices for oil with Gulf War II and increased demand, Southwest has twice led fuel-related fare increases, which were quickly followed by all the Incumbents.

Now a formidable competitor, Southwest is the largest domestic US airline, followed by American, Delta, and United (US DOT Bureau of Transportation Statistics, 2007). Southwest has access to significant resources because it has been profitable since the early 1970s despite the cyclical nature of the industry. Once Southwest enters a market, it “is not easily persuaded to leave...” (Oster & Strong, 2001, p. 14), having only exited four cities since Deregulation — Beaumont, Denver, Detroit, and San Francisco. Southwest has since reentered Denver and San Francisco.

Incumbents and Southwest appear to have developed tacit co-existence where Hub and Spoke Incumbents dominate dense short-distance markets to their hubs, and Southwest dominates other short-distance markets (US DOT, 1993). “Southwest ... has not been subject to ... predation... incumbents’ recent restraint ... is ... due to their experience gained from attacking Southwest... Southwest starts new service with high frequent service, making it very expensive for incumbents to ‘bracket’ ... Southwest’s flights” (Knorr & Arndt, 2005, p. 165) (see Chapter 9). Oster and Strong (2001) did not find any aggressive response to Southwest’s moves on the part of other Incumbents nor by Southwest to Incumbents’ moves. While Incumbents do lower fares in

response to Southwest's entry, Incumbents' fares remain higher than Southwest's and there is no increase in Incumbents' capacity.

While Southwest normally responds mildly to Incumbents' entry into its markets, this has not been the case with Virgin America's entry into the US in 2007, and in particular the California market which Southwest dominates. Southwest re-entered San Francisco Airport, which it had left due to excessive weather delays, flooded the market with hourly flights between Northern and Southern California, offered frequent flier program (FFP) bonus points, and advertised heavily on radio and television, a typical Incumbent response to New Entrants.

Southwest can also retaliate against Incumbents as it has a large national presence and significant financial resources. Evans and Kessides, in what they called the "Golden Rule" or mutual forbearance, found "firms that meet as competitors in many markets may be less likely to exploit their competitive advantage in any particular market for fear of retaliation in some or all of their jointly contested markets" (Evans & Kessides, 1993, pp. 464-465). Multi-market contact can potentially strengthen oligopolistic coordination within specific markets with fares higher on routes served by airlines with extensive inter-route contacts (Chen, McGrath, & MacMillan, 1998, October; Evans & Kessides, 1993, 1994). This was also seen in the Incumbents "trashing and bombing" activities against competitors to bring fare discipline to markets (see Chapter 6).

DOT believed the compression of short distance route fares by Southwest and other low cost airlines "... holds the promise of the airline industry becoming much more efficient in short-haul markets, enabling the industry to carry passengers in such markets profitably at greatly reduced prices" (US DOT, 1993, p. 8). DOT also believed that American and US Airway's reduction in hubs "will eventually reduce the level of competition on longer haul markets so that the carriers can increase prices to more economic levels" (US DOT, 1993, p. 5). Chapter 6 discusses the rise of the low cost carrier. Starting in 1990 with 10% of the market and increasing to 35% of the market in 2006 (Bailey, 2006b), this trend confirms the DOT's belief that Southwest has the ability to monopolize markets and that Incumbents are unable to financially compete in long distance markets. The rest of this chapter will show that Southwest and American are relatively unscathed by financial problems, though American did have to jettison its lucrative CRS and other assets to avoid bankruptcy. Just as Southwest and American share the Dallas market through co-existence, Southwest and American survive in the industry by occupying extremes in the market place. American survives by charging the industry a \$3.7 billion premium while Southwest provides consumers \$19.6 billion of savings.

We have seen how Southwest, as a low cost New Entrant, was able to overcome many obstacles since its founding to become the largest domestic passenger airline and influence the airline industry. Southwest developed the

Point-to-Point network out of satellite airports that allowed them to avoid head-to-head competition with Incumbents. We have also seen how Southwest and Incumbents, in particular American, have developed co-existence strategies. Incumbents abandon airports that Southwest enters or maintain minimal levels of service, and move to defensible hubs that are controlled (either slot- and/or perimeter-controlled) or more lucrative international routes. The next section will discuss other New Entrants and how they survived or failed. If indeed we must fear Southwest as a monopolist, it is crucial to understand how New Entrants can survive and prosper if they are to replace Incumbents and/or provide competition for Southwest.

1978 – 2008: Other New Entrants

While CAB was investigating intrastate carriers like PSA and Southwest as Deregulation models, investment advisors also turned their attention to these airlines. One commented,

One valid argument of the deregulation forces ... is that there is a probably an operator like Southwest who could fly any one of 1,000 top city-pair markets in the US more efficiently than any trunk or local carrier does now. "What frightens me," he said, "is what happens when you extrapolate that possibility to all those 1,000 city pairs" (Aviation Week & Space Technology, 1976b, p. 43).

As reported by Standard & Poor's analyst, T. Canning, five years later,

New Entrants such as Southwest:

... pose a serious threat to the dominance of incumbent carriers on important routes ... this is almost entirely a function of price ... Although the new entrants appear to be generating traffic by tapping a new, more price conscious passenger ... they are undoubtedly also gaining market share from the established carriers.... Typically, the new carriers' fares

are 40 - 50% below Standard Industry Fares (Standard & Poor's, 1981b, p. A56).

The 1976 industry investment advisor was correct in hypothesizing and extrapolating the changed landscape post-Deregulation, with Incumbents significantly challenged by these New Entrants. New Entrants' cost advantages were derived from a substantially lower employee pay scale, with no employees reaching higher pay levels due to seniority, no passenger interlining, no expensive passenger handling and reservation facilities, short flights, and fast turnarounds leading to higher utilization of equipment including airplanes, and except for Southwest, a non-unionized labor force with flexible work rules. New Entrants' cost advantages — their costs run about half of Incumbents' costs (Standard & Poor's, 1981b) — puts significant pressures on Incumbents. United, American, and other Incumbents began to reduce labor costs, change work rules, and employ more part-time workers in response (Standard & Poor's, 1981b).

CAB continued to put competitive pressure on Incumbents by granting route certificates to New Entrants, such as Midway Airlines, Muse Air (Muse) (founded by former Southwest president, M. Lamar Muse), New York Airlines, a subsidiary of Texas Air, People Express (People), and Sun Air Corp. Wall Street funded New Entrants' initial public offerings but not Incumbents. Incumbents were forced to seek debt to provide the overwhelming bulk of external financing (Standard & Poor's, 1981a), as shown in worsening industry average debt to capital ratios from 58% in 1980 to 67% in 1983 (see Chapter

3). It is clear that Wall Street analysts and bankers concluded that New Entrants represented lower financial risks and better returns than Incumbents.

New Entrants Midway Airlines and Muse began operations in 1979 and 1982, respectively. Midway Airlines operated out of Midway Airport, and essentially replicated the route system proposed by Midway-Southwest, connecting Chicago with 32 cities in the Midwest and Eastern Seaboard. Muse was authorized to serve 24 cities from the lower Rio Grande Valley to Chicago, Detroit, and Atlanta, and provide direct competition to Southwest's principal route, Love Field and Houston Hobby Airports (Standard & Poor's, 1981b).

Incumbents were forced to compete with New Entrants primarily over price. "Despite the potential damage to revenues ... [Incumbents] are meeting the fare cuts in order to seriously test the financial staying power of the new companies" (Standard & Poor's, 1981b, p. A56). Incumbents and New Entrants expected an economic equilibrium to arise in the long run:

Carriers continue to compete on routes where fares are so low that breakeven is nearly impossible because carrier managers expect a competitive balance to emerge – someday. Eventually, the hope is, low fares will force weaker airlines out of the markets and reduce competition enough to allow those remaining to make a profit. "We have invested a tremendous amount of money in developing these markets," one carrier official said. "We can't simply walk away. All we can do is hope that over the long term things will stabilize" (Aviation Week & Space Technology, 1980d, p. 33).

There are two types of discounts at work in airlines' strategies:

promotional and structural. The promotional discount is temporary, in most cases used by an airline to advertise its entrance into a new market, with some fares less than one dollar during the first month of service (Standard & Poor's,

1982c). This promotional discount continues today with one dollar fares on *go!*, a Hawaiian Island New Entrant (Segal, 2007). Aloha Airlines, which declared bankruptcy in 2008 blamed *go!* for driving them out of business. The structural discount is more or less permanent and is a prime strategy used by New Entrants to establish a new market and used by Incumbents to establish new routes and maintain market share in others (Standard & Poor's, 1982c).

Most fare wars are precipitated by New Entrants, particularly in heavily populated, long-route markets. Capitol International, a former charter airline, led transcontinental fare discounting, forcing reluctant American, United, and TWA to follow for more than one year (Standard & Poor's, 1982c). World Airways, which began the transcontinental fare wars in 1977 (Aviation Week & Space Technology, 1977b) in one of the earlier CAB deregulation experiments, soon found itself at the receiving end. World felt that United's supercoach fare would drive them out of business, and that United would quickly raise fares afterwards (Aviation Week & Space Technology, 1979j). World claimed uncompetitive behavior: United's seats were sold at less than average total cost, only a few seats were available at the supercoach fare, and seats were cross subsidized by the rest of United's profitable network. United's response was:

"What's the matter, don't they like competition? Do they want some sort of protection after they cried for so many years that the big carriers were protected? We were the only carrier that did not oppose them entering the scheduled transcontinental market, but that doesn't mean we can't compete with them," said a United official (Aviation Week & Space Technology, 1979j, p. 25).

Besides offering low fares, New Entrants had to compete with other strategies to survive in the long run. The pricing structure had to take into account not only the ability of New Entrants to maintain low costs but also how to compete against Incumbents. A competitive strategy cannot be based on one-dimension only, low costs, as McCabe (1998) confirmed.

Several facts can be seen from the preceding discussion:

1. SWA is a monopolist and Incumbents and other New Entrants are unable to compete.
2. Most destructive fare wars are initiated by New Entrants, which is very destabilizing to the airline industry, particularly when combined with unlimited entry. This allows New Entrants to undercut the industry, leaving large revenue losses that Incumbents must survive after the New Entrant has long been gone and bankrupt.
3. Instead of destructive fare wars, Incumbents and Southwest practice détente in which they try to maintain economic equilibrium. As will be discussed later, this is an answer to the empty core.
4. For New Entrants to survive, however, the lesson learned from Southwest is that it is not just on low fares, but other strategies such as low costs, high airplane utilization, less expensive and relatively less congested satellite airports, non-union labor, not providing benefits of legacy carriers such as pensions and health insurance, and a Point-to-Point route system, that will help them survive.

Crisis: Locked Out of Key Airports

New Entrants found themselves locked out of large and medium-sized airports, Concentrated Airports, and slot- and perimeter-controlled airports. Due to the cost to create and maintain Hub and Spoke networks, very few New Entrants could duplicate them at the scale of Incumbents. These constraints forced New Entrants into a number of strategies, primarily luring price-sensitive customers by flying them from one major metropolitan area to another.

In some cases these flights are cost competitive with automobile travel. Most New Entrants do not offer services such as interlining with other airlines, baggage handling, and meals. Some of these New Entrants chose public battles for slot- and perimeter-controlled La Guardia and National Airports as did New York Air. However, most of these New Entrants operated out of satellite airports where they could access key airport space at reasonable prices and with less congestion. Satellite airports had seen Incumbents, nationals, and regionals abandon them, as the airlines sought to rid themselves of unprofitable, low density, previously CAB subsidized routes, and extend into new territories (Standard & Poor's, 1982a). Nationals and regionals sought to emulate Incumbents by emphasizing hub areas where they had strong competitive positions (Standard & Poor's, 1982a).

The use of satellite airports represents a major strategy of New Entrants to access major metropolitan areas. Not only do these satellite airports provide access to passengers, it changes how passengers view access points to the air

transportation system. Now, passengers consider several airport options in travel plans, including New Entrants at satellite airports. Passengers often drive for miles to select a New Entrant at a satellite airport and fly Point-to-Point, with many stops to cross the country. Satellite airport usage opened up previously underutilized secondary and tertiary airports and has provided congestion relief at large and medium-sized airports that were congested when the Deregulation Act was passed.

In 1979, four satellite airports near Atlanta, four near Boston, four near Chicago, four near Denver, two near Washington, DC, and three near San Diego all received FAA funds to renovate and expand their space in an attempt to provide congestion relief at nearby larger airports. The FAA's goal was to lure general aviation aircraft, smaller, privately owned airplanes including corporate airplanes, commuter, and air taxis to satellite airports. General aviation filled the vacuum left by Incumbents and regionals at satellite airports and created congestion due to the lag in keeping up with demand (O'Lone, 1979). However, the satellite airports did take some congestion out of the large and medium-sized airports, which otherwise would have been even more congested. "The satellite airport program ... marks a shift in the FAA's funding of rural airports where there is little opposition to funding airports, [and] where opposition [to airport expansion in urban areas] for environmental reasons can be expected" (Aviation Week & Space Technology, 1979c, p. 22). The criteria for funding these satellite airports included community and environmental

acceptance; willing, financially capable sponsors; and airspace compatible with major airports. This funding shift represented a decrease in funding for large and medium sized airports, at a time of declining federal funding for airports overall. New Entrants capitalized on this funding. Small and medium-sized airports had been shocked at how quickly they were abandoned by Incumbents, regionals, and nationals, and were willing to fund improvements for New Entrants to retain commercial air service for their communities.

There are various types of satellite airports:

1. older, downtown airports that were replaced by newer, larger airports, such as Midway Airport and O'Hare Airport;
2. small general aviation airports owned by municipal governments such as the Oxford Airport or the Hartford-Brainard Airport, both in Connecticut (Hamilton, 2001);
3. "reliever" airports that alleviate congestion at busy commercial airports;
4. private commercial airports opened in World War II (Failla, 1993); and
5. military bases converted to civilian use (US FAA, 2007a).

State and local governments commit funds to improve these airports and provide needed transportation services to them. The FAA allows Passenger Facility Charges (PFCs) for these satellite airports (see Chapter 9).

Crisis: Airport and Airspace Congestion

A look at large, medium, small, Concentrated, slot- and perimeter-controlled, satellite, and former military airports gives the reader a review of issues surrounding congested airports as New Entrants attempt to enter key airports and Incumbents thwart entry. The congestion is not only at the airport but in the national airspace. With passenger and business traveler dissatisfaction increasing with commercial airlines, a large number of travelers use private jets, air taxis, corporate jets, fractional ownership of jets, and charters that vie for space. These smaller airplanes often use the more than 5,000 satellite airports rather than the 46 or so used by commercial airlines. Nonetheless, these smaller airplanes put increased pressure on the air transportation system.

There are approximately 11,000 private jets, but they will be joined by up to 1,650 new very light jets by 2010 that will operate as air taxis (M. L. Wald, 2006), or 400 - 500 each year over the next decade (Sharkey, 2007c). This massive increase in the use of the national airspace puts an unmeetable burden on air traffic controllers. As James C. May, president of the Air Transport Association is quoted as saying: "Air traffic controllers have to pay the same attention to a business jet carrying eight people as they do to a [Boeing] 737 carrying 180" (Sharkey, 2007b, p. C10).

Besides increased traffic from general aviation and air taxis, Incumbents are increasingly using small 50 - 70 seat regional jets, including at slot-

controlled JFK Airport (Belson, 2007). While these smaller airplanes add to the number of airplanes in the national airspace without increasing capacity at the airports or the airspace, they make it possible for air service to continue to small and midsize communities (Sharkey, 2007b).

The Open Skies agreement with the EU will allow increased flights into and from the US in 2008. Willie Walsh, the Chief Executive of British Airways, said, "After the agreement comes into place next year, we are looking at launching flights from the US to key European cities like Paris, Milan, Brussels, and Frankfurt" (Sharkey, 2007a, p. H8). All these flights, whether large jumbo airplanes like the Airbus 380 or the very light jet, place increasing pressures on airport and airspace congestion and determine points for increased competition between Incumbents and New Entrants.

Because airports represent entrances and exits to the national airspace, the air traffic control system and air traffic controllers themselves are assumed to be able to monitor an increasingly complex national airspace that has more satellite airports that require air traffic controllers. In reality, the air traffic control system has not kept up with that demand:

1. Infrastructure has not kept pace with congestion (US Congressional Budget Office, 1988).
2. Many airports need additional capacity to reduce congestion and delays and encourage competition. Available federal funding falls far short over next five years: the FAA estimates a need for \$31 billion,

while only \$1.5 billion in fiscal 1991 was approved for the Airport Improvement Program (AIP) (House Subcommittee, *Airline competition: Passenger facility charges can provide an independent source of funding for airport expansion and improvement projects*, 1990).

3. For the last three years, there has been a crisis in delayed flights across the nation. Flight delays are increasing, especially in the New York/New Jersey area, leading to upset consumers. Congress and the public want a "Passengers' Bill of Rights," that will prevent airlines from leaving passengers stranded on the tarmac for nine hours.

4. The number of domestic airline passengers doubled since 1980 to 2000 and more planes are being used, particularly smaller-capacity, fuel-efficient regional jets (Sharkey, 2000).

5. Infrastructure constraints and congestion problems are significant long-term problems with air traffic expected to triple by 2025, according to Andrew B. Steinberg, Assistant Secretary for Aviation and International Affairs of the DOT (Senate Committee, *Statement of andrew b. Steinberg*, 2007).

6. As reported by the Associated Press in 2007, "Air travelers face a high risk of a catastrophic collision on airport runways ... because of faltering federal leadership, malfunctioning technology, and overworked air traffic controllers, Congressional investigators said" (Associated Press, 2007, p. A18).

7. According to a New York Times Editorial, also printed in 2007, "The so-called NextGen technology that would replace the 1950s-era equipment in air towers is long years behind schedule. By the time it is finally in place, it, too, will be outdated" (New York Times Editorial, 2007, p. A30).

In a discussion of how to pay for a new air traffic control system, New Entrants and Incumbents found themselves unsurprisingly on opposite sides. Herbert Kelleher, CEO of Southwest, testified before the National Civil Aviation Commission (*Testimony of herb kelleher*, 1996) on the allocation of fees, representing New Entrants America West, Western Pacific Airlines (Western Pacific), Reno Air, ValuJet, and Frontier Airlines, and one Incumbent, Alaska. According to Kelleher's testimony, New Entrants and smaller airlines would pay 16% of the air traffic control system, while Incumbents (whom Kelleher called the "Big Seven") American, Delta, and Northwest would pay .0845% each, and Continental, TWA, United, and US Airways, who joined the lobbying effort later, would pay about 9% in total. The Big Seven's intent, according to Kelleher, was to decrease their tax burden by allowing small regional airlines, affiliated with one or more of the Big Seven to pay low fees, and place \$500 million of fees on New Entrants (National Civil Aviation Review Committee, *Testimony of herb kelleher*, 1996).

One of the suggested solutions to the problem of congested airspace and a lack of air traffic controllers has been a call by FAA critics to privatize the

FAA (Winston, 1999). Opponents to this idea question the wisdom of relinquishing public control of the country's airspace to the airline industry, which already has a propensity to discourage competition and consolidate routes and airport gate slots into regional quasi-monopolies (Sharkey, 2000).

Kelleher in his testimony made it clear that Southwest was against a privatized FAA,

...every "problem" is not a "crisis." The crisis mongers ... said that "Privatization" of key FAA ... services will cure all ills. A "privatized FAA" is an oxymoron... "privatizing" a natural pure monopoly is absurd. Privatization ... only works in an environment where competition lives and thrives. Is anyone suggesting that we break up the FAA and allow competition in the delivery of air traffic control services? Probably not even the Big Seven have the temerity to put forth such a notion. Only those with special agendas could say ... that "privatizing" ... the FAA will ever lead to innovation and greater productivity... The issue is not one of economic efficiency, but of economic power, economic domination, and economic control. The end game of the Big Seven is takeover and control of the FAA ... for their exclusive benefit.... As they now admit, their so-called "user fee" is a mere stalking horse for privatization of the FAA... We ... are hoping that they don't get their way ... (National Civil Aviation Review Commission, *Testimony of herb kelleher*, 1996) (underline in the original).

Another effort to increase efficiency at congested airports and airspace is to redesign traffic flows. The New York/New Jersey/Philadelphia Metropolitan Area Airspace Redesign Project (Airspace Redesign Project) has been in FAA development for nine years, including public meetings on how airplanes will be routed from five major airports and sixteen satellite airports, in a 31,000 square mile area stretching from Delaware to Connecticut (Hochswender, 2007). The proposed change is to increase air traffic at satellite airports like Stewart International in New Windsor, NY, Trenton - Mercer County in West Trenton,

NJ, and Westchester County Airport in White Plains, NY, and provide congestion relief at the large airports, including slot- and perimeter-controlled JFK, La Guardia, and Newark Airports (Hochswender, 2007). This is in keeping with the FAA's efforts to fund satellite airports in the late 1970s and early 1980s. In the Airspace Redesign Project, the FAA is trying to rewrite the "Highways in the Sky,"

...highways in the sky are three dimensional... wherever you have heavy traffic... both horizontal and vertical separation of the traffic flows must be provided. To airspace designers, controllers and the FAA, the paramount issue is ... keeping airplanes separate from one another in the air. This is their operational imperative, their higher calling. After separation, the goal ... is ... the need to minimize delays, which ... are endemic to the system... It is therefore not surprising that the FAA does not consider ground noise the first priority in its planning (Hochswender, 2007, p. C14).

However, for the communities who are currently below or proposed to be below the "Highways in the Sky" in the Airspace Redesign Project, the sound pollution is unacceptable, and several communities are threatening litigation and/or Congressional action to halt the project (Bailey, 2007c; Hochswender, 2007).

Other FAA suggestions to reduce congestion are to fly airplanes closer together, allow commercial airplanes to fly in military space, and congestion-pricing that charges higher fees for take offs and landings at prime times (Wald, 2007a). As demand for all types of airports and airspace increases, and increased community objections arise over airport expansions, the question is how will New Entrants and competitors access airports to provide competition?

Crisis: Survivability of New Entrants

Midway Airlines built a hub at Midway Airport that connected to fifteen cities. Muse initiated service between Dallas and Houston in mid - 1981, but had its hub at Midway Airport. It was hampered by the lack of airport gates as a result of the PATCO strike (see Chapter 6), but gained gates after Braniff's bankruptcy and expanded to two other cities in the southwest (Standard & Poor's, 1982a). These airlines were low cost, no frills airlines, but Midway Airlines used a Hub and Spoke system while Muse used a Point-to-Point system. Because of their low costs and fares they were able to skim considerable traffic from Incumbents. Midway Airlines merged with bankrupt Air Florida in 1985 and interlined passengers in 1987. Midway Airlines was subject to vigorous competition by Incumbents and filed for bankruptcy in 1991, 23 years after beginning service. Muse became TransStar Airlines and was purchased by Southwest in 1986.

With the purchase of TransStar Airlines, Southwest became a significant competitor of Midway Airlines because it entered Midway Airlines' hub at Midway Airport. Southwest continued to build its dominance by purchasing six gates from ATA when it entered its first bankruptcy in 2004. Midway Airport, an older, satellite airport has no room to expand its facilities or runways, which are shorter than FAA guidelines, a factor that led to Southwest's only fatal accident. With Southwest's expansion at Midway Airport, both Chicago airports are now congested, although only O'Hare Airport is slot-controlled. Midway Airlines

became a victim of Southwest's success. Muse was a victim of Southwest's merger strategy, a strategy extensively used by Incumbents (see Chapter 6).

Table 25 shows New Entrants acquired by Incumbents and vice versa. As discussed in Chapter 6, Incumbents often purchased competitors or aligned in code sharing or feeder programs, reducing competition in key markets. While Incumbents primarily use this strategy, Southwest mimicked this strategy at two airports, Midway and Salt Lake Airports. America West used this strategy in 2005 to purchase twice-bankrupt US Airways. Thus, we see that many New Entrants disappeared because they merged with stronger competitors and were no longer competitive threats to either Incumbents or other New Entrants.

Presidential Airways is an example of a New Entrant who was forced to become an Incumbent feeder airline. It began operations at Dulles Airport, but when Texas Air and United created hubs there, it could not survive and became a feeder airline to Continental Express (Steptoe, 1987).

Presidential's experience illustrate the difficulties small airlines face as they try to compete in an industry increasingly dominated by large companies that own several carriers... small, upstart lines may be relegated to supporting roles in the coming years. The reason: Larger companies, which are wealthier and more efficient, are waging intense price wars that already have claimed more than 120 airlines in the past eight years... the big companies are moving quickly to exploit the upstarts' weaknesses ... Louis Marckesano, a transportation analyst at Janney Montgomery Scott Inc. in Philadelphia, predicts ... the smaller ... [New Entrants] serving as "adjuncts" ... forced to remain in a geographic area or on a specific route system (Steptoe, 1987, p. 6).

Pacific Express, as described in Chapter 6, was forced into a cooperate-or-compete situation with United. Atlantic Coast Airlines, a Delta and United

Table 25
Mergers of New Entrants and Incumbents: 1983 – 2008

Acquired Airline (New Entrant unless otherwise noted)	Acquiring Airline (Incumbent/New Entrant/ Foreign Airline)
Horizon; Jet America	Alaska (Incumbent)
US Airways (Incumbent)	America West (New Entrant)
Air California; Business Express; Nashville Eagle; Reno Air; Wings West	American (Incumbent)
20% Atlantic Southeast; Comair; 20% Sky West	Delta (merged with Northwest 2008) (Incumbent)
JetBlue	19.8% by Lufthansa (Foreign Airline)
Air Florida	Midway Airlines (New Entrant)
8% Simmons	Northwest (merged with Delta 2008) (Incumbent)
Empire Airlines; Henson Aviation; Jetstream International	Piedmont Aviation (subsequently merged with US Airways) (Incumbent)
Morris Air; Muse Air	Southwest (New Entrant)
68% Bar Harbor; Britt Airways; Continental; Eastern; Frontier Airlines; People Express; Rocky Mountain Airlines	Texas Air, renamed Continental (Incumbent); 19.8% by SAS (Foreign Airline)
Partial ownership of Air Wisconsin	United (Incumbent)
Pacific Southwest Airlines; Pennsylvania Airlines; Piedmont Aviation; Suburban	US Airways (Incumbent); 20% by British Airways (Foreign Airline); subsequently merged with America West (New Entrant)

Note: data compiled by author

feeder airline, became a competitor as Independence Air (US GAO, 2004) and failed.

When New Entrant Midwest Express tried to enter slot-controlled airports (see Chapter 9) Incumbents American and United used travel agent commission overrides (TACOs), a CRS follow-on innovation, to steer passengers to their flights and away from Midwest Express (see Section 2). As a result, Midwest Express was forced to discontinue service in 1995 between Rockford, IL and Boston, La Guardia, Newark, Philadelphia, and National Airports (US GAO, 1996). Midwest Express' national sales manager told DOJ that TACOs are now part of their decision process to enter new markets: "... we first establish that we will not be foreclosed from a substantial share of the market by the large important travel agencies" (US GAO, 1996, p. 16). In response to TACO criticism, the CEO and the President of American told GAO that such agreements are standard marketing tools that any airline can offer and "...it was simply good business practice for an airline to encourage travel agents to steer traffic to it" (US GAO, 1996, p. 16). TACOs were similarly used by Northwest to successfully prevent Southwest's entry at Detroit Airport (US GAO, 1996).

When Reno Air tried to launch nonstop service between Reno/Tahoe International Airport (Reno Airport) and Minneapolis Airport in 1992, Northwest, who had discontinued service in 1991, retaliated against Reno Air by launching three daily non-stops; starting non-stop service from Reno Airport to Los

Angeles Airport, Seattle Tacoma International Airport and San Diego International – Lindbergh Field Airport (San Diego Airport); implementing TACOs; and lowering fares (Oster & Strong, 2001). Reno Air cut services to one flight a day due to losses and finally exited the Minneapolis market in 1993, where upon Northwest increased fares and decreased the number of flights. Reno Air merged with American in 1999.

New Entrants Sun Jet, Vanguard Airlines, and Western Pacific complained of American's predatory behavior in *U.S. v. American et al.* ("U.S. V. Amr corp. Et al," 2000) (see Chapter 9). These New Entrants were subject to severe competition by American, though American's behavior was not deemed anticompetitive by the Courts. Vanguard Airlines, who sought to avoid American by flying out of Love Field Airport, faced years of litigation with American and declared bankruptcy despite winning in the Courts (*American Airlines Inc. v. US DOT*, 2000). New Entrants were "trashed and bombed" and America West and Midway Airlines were "repeatedly disciplined" by Incumbents (Nomani, 1990; Trottman, 2002) (see Chapter 6). Braniff II started a fare war with United and refused to back down (*U.S. v. Airline Tariff Publishing Co. et al.* "U.S. V. Airline tariff publishing co, Alaska Airlines, American airlines, Continental Airlines, Delta air lines, Northwest airlines, trans world airlines, united air lines, and usair," 1992) (see Chapter 6). It went bankrupt.

Some New Entrants adopted strategies to avoid Incumbents' attention. For example, Sun Jet initially remained below the Incumbent's "radar" by not

flying more than two frequencies on any single route (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000). Access Air chose to serve large destinations not located at Incumbents' hubs and ensured their fares were above the Incumbents' variable costs (Gillen & Lall, 2005; U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000). Access Air's strategy was, "Stay off the elephants paths ... don't eat the elephant's food... and keep the elephants more worried about each other than they are about you..." (Gillen & Lall, 2005, p. 112). Knorr and Arndt (2005, p. 165) concluded, "Southwest [was] able to survive in [its] early years by not competing head-to-head with ... [Incumbents] on large parts of its networks -- strategy ignored by other low-cost entrants."

As technology improves the fuel efficiency and travel distance of the regional jet, it not only stimulates air travel over shorter routes and effectively competes with the car, bus and train, it again transforms the short-haul markets (Standard & Poor's, 2007). The regional jet is not only cheaper to purchase than most commercial airplanes, but it is more cost effective: a lower load factor for breakeven, round-the-clock service for business travelers who make up 70% of the passengers, and a larger percentage of passengers feeding Incumbents' hubs (Standard & Poor's, 2007). The new regional jets not only work to support Incumbents' Hub and Spokes, but can be used as point-to-point competition against Incumbents' full-size fleets. This new technology comes at a difficult time for Incumbents as they have been forced to sell many assets, including their regional airlines, to stave off or restructure in bankruptcy.

As Incumbents lose their regional airlines due to bankruptcy, they lose vertical integration and competitive advantages of operating smaller more fuel-efficient airplanes, flown by lower paid employees, and may face a competitive threat in the future. Yet, the danger may be remote, as Standard & Poor's analysts, Jim Corridore and Philip Baggaley note,

The relationship between the [Incumbent] ... and regional airline is reciprocal. The [Incumbent] ... cannot rely solely on their own expensive aircraft and crews to gather passengers to feed into their hubs. The regionals depend on major carriers to provide connecting flights at central hub airports for up to 60% of their passengers. The major airlines also provide credibility, worldwide market power, and the all important designator code in the CRS. To be successful, regional and major airlines must work as a seamless operations using a single system for booking and boarding (Standard & Poor's, 2007, pp. 14-16).

Thus, the conundrum for New Entrants of compete or cooperate continues. New Entrants provide future competition for the industry, but how they survive to become that competition is the issue that has plagued the industry since Deregulation. So far only New Entrants Southwest and America West have survived the test of time, and America West has already been through bankruptcy. America West merged with twice bankrupt US Airways, though because of pilots' disputes on seniority rules and conflicting CRSs, has failed to merge the two companies operationally two years later. US Airways, the successor company, contemplated a merger with United in 2008, which was previously rejected by DOJ in 2000. In the meantime, hundreds of New Entrants have failed, costing investors and the public millions of dollars in lost capital and potential lower fares.

Crises: Bankruptcy

As the industry weathered business cycles (see Chapter 3), it became littered with bankrupt airlines including many New Entrants. Standard & Poor's analyst S. Klein, commented on airline bankruptcy:

Unlike most industries, bankruptcy is not often the final resting place for airlines. Pan American ... has had many lives. In ... 1999, the DOT found Pan American fit to restart scheduled service. Kiwi International Airlines, which went through two bankruptcies since its founding in 1992, started liquidation ... in ... 1999. This odd pattern of bankruptcy ... stems from the strange belief held by poorly informed investors that the airline industry is glamorous. Some of the mistakes common to bankrupt airlines are unreliable service, weak management, and poor capitalization, and a suicidal strategy to take low-margin leisure traffic from a dominant and popular carrier (Standard & Poor's, 1999b, pp. 9-10).

A partial list of bankrupt New Entrants is shown on Table 26. Some of the airlines are designated by Roman numerals to indicate their reincarnation. For example Pan Am II was resurrected in 1999 and Midway Airlines was liquidated in 2001, resurrected in 2003, and liquidated later that year. In addition to the reasons listed by Standard & Poor's, New Entrant bankruptcies can also be caused by the business cycle, recessions, safety concerns, crises such as the 9/11 terrorist attacks, high fuel prices, and liquidity crises.

The business cycle and its affect on the airline industry are described in Chapter 3. Demand dries up and both Incumbents and New Entrants are unable to decrease capacity. Some airlines begin reducing fares to cover costs and provide cash flow. As Standard & Poor's analysts noted, "Generally, the industry is susceptible to fare wars when capacity levels far exceed demand.

Table 26
Partial List of Bankrupt New Entrants

Access Air	Air21	Air Florida	Air South
Allegiant Air	Aloha Airlines, twice	America West	ATA Airlines, twice
Atlas Air/Polar Air Cargo	Braniff II	Business Express	Crescent Airways
Conquest Airlines	Eastwind Airlines	Euram Flight Centre	Era Aviation
Fine Air Services	Florida Coastal Airlines	Frontier Airlines I and II	GP Express
Grand Airways	Great Plains Airlines	Hawaiian Airlines	Independence Air
Kitty Hawk	Kiwi International, twice	The Krystal Co.	Legend Airlines
Mahalo	Markair	Mesaba Airlines	Midway Airlines I and II
Mountain Air Express	National Airlines II	Pan Am II	People Express
Pro Air Inc.	Rich International	Skybus Airlines	Southeast Airlines
Sun Country Airlines	SunJet International/ Myrtle Beach Jet Express	Tower Air	Trans Meridian Airlines
ValuJet	Western Pacific		

Note: Suffixes distinguish versions of the same airline name but capitalized by different investors. The data collected by the author.

Because airlines have high fixed costs ... relative to their marginal costs (the cost of flying one additional passenger), fare wars can reach extremes before order is restored" (Standard & Poor's, 2007, p. 14). After ValuJet's crash in 1996, the FAA increased safety inspections of New Entrants. As a result, passengers left New Entrants and preferred Incumbents and stable New Entrants, such as Southwest, who were perceived as safer. Kiwi International and Air21 entered bankruptcy shortly thereafter, Jet Train temporarily halted operations, and it became even more difficult for New Entrants to access capital markets. Carnival Air Lines, for example had to cancel its initial public offering because of lack of capital.

Thereafter, the combined 9/11 terrorist attacks, recession of 2001, Gulf War II, and high fuel prices led to many New Entrant bankruptcies as demand dropped significantly and fuel prices escalated. The following New Entrants failed in this time frame: ATA, Allegiant Air, Fine Air Services, Kitty Hawk, Legend Airlines, Midway Airlines, National Airlines, Pro Air, Inc., and Tower Air. The 2008 recession, housing and liquidity crises, and high fuel costs have led to the next round of bankruptcies among New Entrants: Air Midwest, ATA (for a second time), Aloha Airlines (for a second time), BigSky, Champion, Frontier Airlines II (despite 14 years of operations), and Skybus Airlines.

When a liquidity crisis affects capital markets airlines are unable to access cash or credit to survive their own financial crises or to use for mergers with other companies. In the early 1990s, United proposed an employee stock

ownership (ESOP) governance but was unable to access capital markets due to a liquidity crisis. While United is not a New Entrant, it is apparent from this example how liquidity crises hurt the ability of airlines, New Entrants and Incumbents alike, to survive or execute a strategy that may lead to survival. A liquidity crisis, begun in 2007 by the housing crisis may have led New Entrant JetBlue to seek a capital infusion of \$300 million from Lufthansa for a 19.8% ownership stake. Standard & Poor's analysts' commented on New Entrants including JetBlue:

Overall, the current crop of low-fare, start-up carriers has not proven to be better managed or capitalized than its predecessors. One major exception is JetBlue ... which we think is the biggest threat to industry price stability since Southwest entered the business in 1971... The carrier is well capitalized, uses brand-new jets, and ... has generated high load factors on its point-to-point route structure (Standard & Poor's, 2007, p. 14).

However, from 2005 – 2006 JetBlue posted losses due to fuel costs (Standard & Poor's, 2007) and \$433 million in current debt obligations. The airline curtailed growth plans, sold assets, and was unable to pay its debt using cash flow and money on hand, reported William J. Greene, a Morgan Stanley analyst (Sorkin & Bailey, 2007). So, despite being the most promising New Entrant since America West in the 1980s, JetBlue is facing financial difficulties.

America West can be considered the biggest New Entrant since Southwest. Further, America West seems to be transitioning into an Incumbent with a cost structure and fares between Southwest and other Incumbents. Part of their success is due to the work of David Bonderman of Texas Pacific. Bonderman brought America West out of bankruptcy in 1994 taking the

company forward to merge with US Airways in 2005. Prior to that, Texas Pacific controlled Continental and also brought it out of bankruptcy; tried to get control of United in its bankruptcy and US Airways in its first bankruptcy; and is tried again for a United - US Airways second merger attempt. Texas Pacific also controls the CRS, Sabre Holdings. Because Bonderman and Texas Pacific are one of the few ventures to make money on airlines, particularly those in bankruptcy, this may be the future, unfortunately, of the industry. As Texas Pacific gains more control of US and foreign airlines as well as a key CRS and internet travel agencies (see Section 2), they will become a force to be considered.

As can be determined from this evidence, the declaration of bankruptcy has become a significant tool for New Entrants and Incumbents alike. This has led American and other airlines to complain that weaker airlines use the bankruptcy courts to reduce costs and undercut prices, harming the industry. Borenstein and Rose (1995) studied seven Chapter 11 bankruptcies from 1989 to 1992, and found no support for bankruptcy forcing competitors to lower prices. However, as discussed in Chapter 6, a financial weak airline competing in a Concentrated Airport caps the hub premium an Incumbent can earn and thus does have a market impact on passengers and airlines, as well as lowering the industry cost averages as shown in the statement by Assistant Secretary Steinberg below.

Andrew B. Steinberg, Assistant Secretary for Aviation and International Affairs of DOT testified before the Senate Committee on bankruptcies and their affect on the industry,

... airline industry analysts ... observed that the... industry is, paradoxically ... easy to enter and hard to leave ... an "exit barrier" for failed firms that is the inadvertent consequences of Chapter 11 [bankruptcy]... airline stakeholders (lenders, suppliers, employees) - any one of whom could singly cause an air carrier's demise - rarely force such an outcome ... the net result ... is, perversely enough, that those carriers who manage to avoid bankruptcy eventually find themselves at a serious competitive disadvantage... when one firm falls behind on its aircraft lease payment, its lessors may lack ... leverage ... Airports ... [and] labor usually makes the same decision ... [T]he risk of continuing to invest in or extend credit to a[n] ... airline is outweighed by the potential reward if the company should survive... this ensures that even failing airlines will almost always have access to capital, thus perpetuating the cycle of failure (Senate Committee, *Statement of Andrew B. Steinberg*, 2007, pp. 3-5).

What Assistant Secretary Steinberg discussed are a number of the problems that prevail in an industry driven by the business cycle, public policies, and financial markets. Because the industry is capital intensive with 80% of its costs fixed, Chapter 11 produces, as Assistant Secretary Steinberg said, a "paradoxical exit barrier." Investors, suppliers, and employees have the choice of accepting 10 cents on the dollar for their debt/contracts or taking the loss, with no other opportunities to redeploy assets or find gainful employment. This creates what Assistant Secretary Steinberg calls "a cycle of failure" where almost all bankrupt or near bankrupt airlines will be recapitalized and reemerge from bankruptcy.

Probably the most ironic and unintended policy consequence of these bankruptcies is that those airlines that do not to enter bankruptcy are at a

serious competitive disadvantage — they have not renegotiated their debt and labor contracts and thus continue to carry legacy costs. Hence, Southwest has the highest labor costs in the industry and American and Continental, who did not enter bankruptcy when five of ten of the largest Majors did in the early 2000s, have significantly under funded pensions (Standard & Poor's, 2005). If avoiding bankruptcy is the “correct” business policy for a company or individual, it is not financially rewarded (see Chapter 3).

Wong and Maynard (2003) argued that the wave of bankruptcies in the 1990s failed to force the industry to change its business model. Therefore, problems in the industry persist: a fare structure that has driven away business travelers, Hub and Spoke networks, oversupply of seats to protect market share, and government bailouts (Wong & Maynard, 2003). The industry matches the business cycle, which further exacerbates its problems: when airlines make profits in the upswing, unions ask for their share; when airlines hover on the edge of bankruptcy, airlines ask unions for give backs. While industry experts say the industry has an excess capacity problem brought on by unlimited competitive entry, regulators are unwilling to approve mergers that would allow consolidation, cost savings, and a reduction in excess capacity (Wong & Maynard, 2003).

Consumers generally avoid financially troubled airlines for fear of losing any money they may pay in fares. Until November 2007, federal law (14 CFR 145) required other airlines to fly passengers holding tickets on a liquidated

airline for \$50 if it operated flights on the same routes (Taday, 2008). The financial risk of booking on financially weak airlines was gone. This put downward pressure on fares as cash-strapped airlines increased cash flow by selling low fare tickets. Other airlines competing with these financially constrained airlines were forced to meet their fares. However, Congress has chosen to allow the federal law to expire, requiring passengers to consider the credit-worthiness of the airline they book.

In closing, Assistant Secretary Steinberg said to the Senate Committee of the future of the US airline industry,

I am confident that if we can avoid another cycle of bankruptcy, there is ... reason to expect US airlines to ... exploit ... their advantages ... offered by ... international aviation markets through "open skies" agreements... Fewer airlines (because of exit or merger) is not necessarily bad (Senate Committee, *Statement of Andrew B. Steinberg*, 2007, pp. 5-6).

Thus, while the airline industry is susceptible to bankruptcies due to sensitivity to the business cycle, "exit barriers," and competitive disadvantages for those who do not undergo bankruptcy, the DOT feels the bankruptcy cycle will be broken by the opening of international markets. While not all airlines, including Southwest, offer international travel, the hope for US airlines is international travel. However, US airlines will face foreign airlines that are better capitalized, do not have legacy costs since those costs are paid for by governments, have newer, more fuel efficient airplanes, and a non-demoralized workforce.

Crisis: Return to Point-to-Point

New Entrants such as Southwest and JetBlue, though no longer start-ups, have been the source of much fare pressure (Standard & Poor's, 2007). Their Point-to-Point strategy has made significant incursions into Incumbents' Hub and Spoke systems and has reduced above industry rents. Incumbents are responding by reducing their reliance on the intense scheduling of airplanes coming to a hub. Delta, joining American and United, has adopted a schedule that has planes coming and going throughout the day, more in keeping with the Point-to-Point system. This approach increases airplane utilization. Delta expects the change will give it the equivalent of nineteen additional airplanes, allowing it to operate more flights, and save \$50 million - \$100 million per year (Hart & Maynard, 2005). The old system was "... a very costly model, because your valleys are very, very inefficient," said Richard W. Cordell, Senior Vice President for airport customer service at Delta (Hart & Maynard, 2005, p. B2). The changes reduced airplane turnaround time from 62 minutes to slightly more than 50 minutes. The downside is that there are longer connection times between flights, which increased from 3 to 77 minutes (Hart & Maynard, 2005).

The Incumbents are also moving their larger capacity planes to more lucrative overseas markets where the competition is less intense and where fixed fares still prevail in some countries (primarily Asia) (Sharkey, 2007b). This matches Assistant Secretary Steinberg's expectation that US airlines would move to international routes. Of course, Open Skies agreements allow for

movement of foreign airlines into the US as well as the reverse. Lufthansa has already gained access to slot-controlled JFK Airport by its purchase of 19.8% of JetBlue (see Chapter 9).

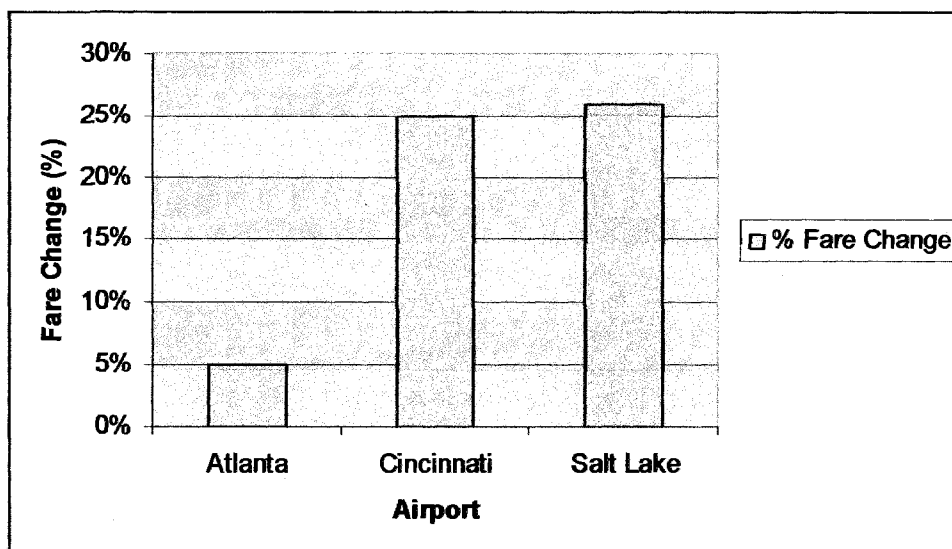
Competitive Fare Airports

A review of those airports that have airlines offering competitive low fares serves as a counter-point to Concentrated Airports that are dominated by one or two Incumbents. Since New Entrants provide most low fares, it is important to understand how they are able to succeed at these airports despite Incumbents' efforts to control Hubs, regions of the US, or specific airports. Also of interest are those airports that were once designated as Concentrated Airports but no longer have that designation, such as Denver and Salt Lake Airports (US GAO, 1993). Baltimore Airport has a diverse portfolio of competitive airlines as a result of airport management practices. This section will review three Delta hubs, Atlanta, Cincinnati, and Salt Lake Airports; one United hub, Denver Airport; and Baltimore Airport, and the role of New Entrants and airport authorities at all of the above.

Delta Hubs at Atlanta, Cincinnati, and Salt Lake Airports

Figure 30 shows the percentage fare change from 1985 to 1988 at the Delta dominated hubs of Atlanta, Cincinnati, and Salt Lake Airports. Where Delta was able to establish a dominant position and was not constrained by a

Figure 30
Percentage Fare Change at Atlanta, Cincinnati, and Salt Lake Airports:
1985 – 1988



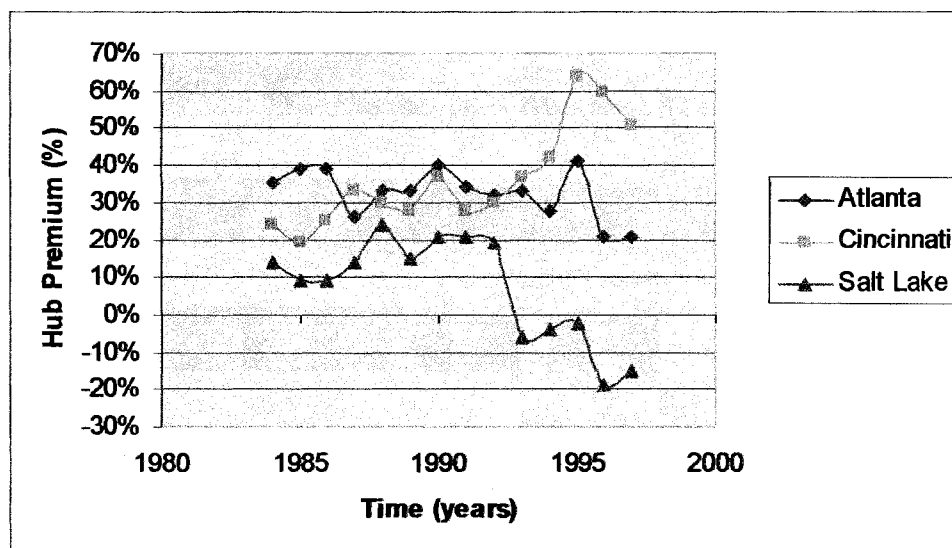
*Note: The data are from *Airline Competition: Higher Fares and Reduced Competition*, by US GAO, 1990, Washington, DC: US GPO, p. 54, Table 4.1.*

financially- troubled competitor, as they were at the Atlanta Airport by Eastern, the airline was able to obtain significant fare increases.

Atlanta Airport

As shown in Figure 31, Delta saw its hub premiums dip at Atlanta Airport as Eastern spiraled towards bankruptcy, only to recover after buying Eastern's airport slots, gates, and equipment. Hub premiums dipped again with the 1991 recession. In the mid-1990s ValuJet established a hub at Atlanta Airport and served 28 cities with 22 spokes radiating from Atlanta (Gillen & Lall, 2005). American valued Delta's loss to ValuJet at \$232 million/year (Gillen & Lall, 2005)

Figure 31
Delta's Hub Premium at Atlanta, Cincinnati, and Salt Lake Airports:
1984 – 1997



Note: The data are from S. Borenstein's presentation to the Transportation Research Board Study Committee on Airline Competition, Jan. 1999, Table 2, and referenced in *Predatory Practices in the U.S. Airline Industry*, by C. Oster, Jr., and J. Strong, 2001, Bloomington, IN: Indiana University, Table 6 and Appendix B.

and Delta's hub premium fell. The temporary rise in Delta's hub premium occurred after ValuJet's crash, only to decline when AirTran took over ValuJet's Atlanta Airport holdings.

As Delta's fortunes have risen and fallen, the Atlanta Airport Authorities are making a concerted effort to open their airport to more New Entrants and to take away some of the inherent privileges of its Incumbent. The airport authorities have retained control of a number of gates and are considering a moratorium on long-term exclusive use gates and ticket counters.

Cincinnati Airport

In contrast to Atlanta and Salt Lake Airports, Cincinnati Airport has remained a Concentrated Airport since Delta's 1986 purchase of regional airline, Comair. As Delta's market share at Cincinnati increased to 88% in 1992 with no New Entrant or other competition, Delta's hub premium was less affected by fare wars and the 1991 recession (see Chapter 6).

Salt Lake Airport

Salt Lake Airport became a secondary hub for Delta after it merged with Western in 1986, and produced a significant hub premium (see Chapter 6). Morris Air, a low-cost New Entrant, entered Salt Lake Airport but was purchased by Southwest in 1993. Delta's hub premium fell below zero at Southwest's entry, as shown in Figure 31. As DOT reported, "Southwest's entry often causes incumbent carrier revenues to drop by one half despite greater traffic volume, which, at the least, results in added traffic handling costs, and sometimes added capacity costs..." (US DOT, 1993, p. 6), the so called the "Southwest Effect."

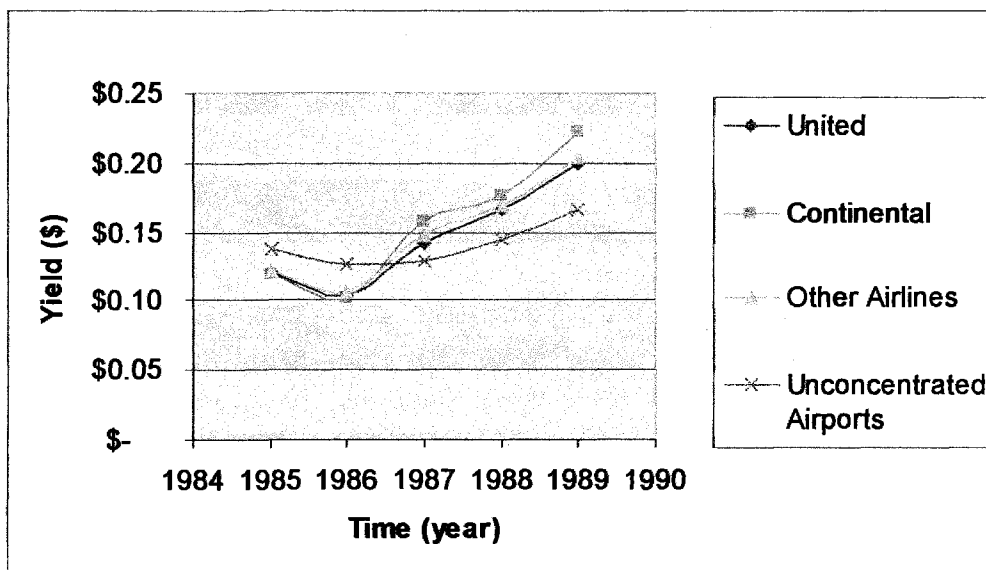
Airport authority practices have also helped New Entrants at Salt Lake Airport, as reported by Russell C. Widmar, Executive Director of the Salt Lake City Airport Authority. The airport authority retains control of several gates and a limited amount of ticket counter space that can be made available to New Entrants at reasonable terms and prices, it regulates sublease prices, and

retains the right to reject subleases if prices are unreasonable (US FAA/OST, 1999a). These practices ensure a positive environment for New Entrants. Delta is no longer able to obtain above industry rents at Salt Lake Airport to support other activities on its Hub and Spoke system.

United Hub at Denver Airport

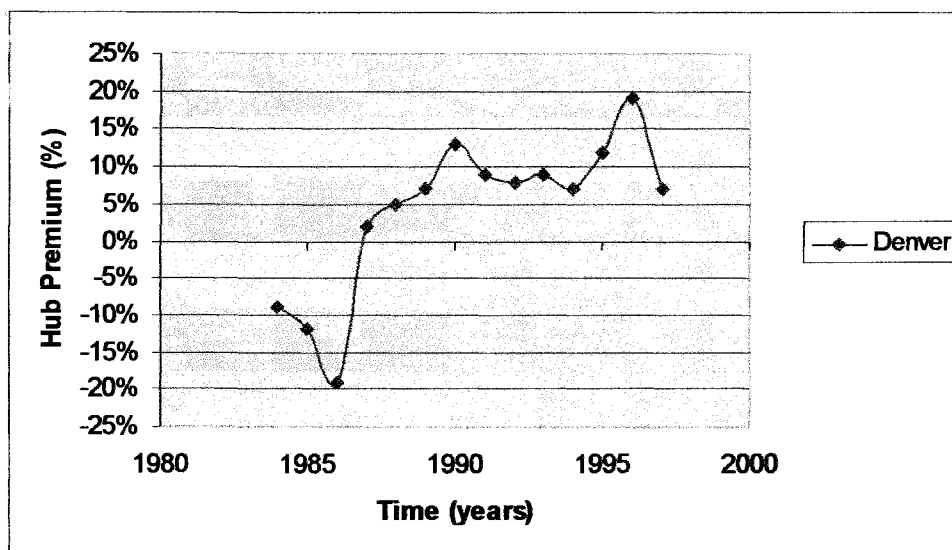
United's second hub is at Denver Airport, but in contrast to Incumbents at other Concentrated Airports, United failed to achieve significant yield premiums, as shown in Figure 32. While United's yield increase of 66% was

Figure 32
Denver Airport Hub Yields: United, Continental, and Other Airlines v. 38
Unconcentrated Airports: 1985 – 1989



General Note: 1989 only includes 1st and 2nd Quarters; Texas Air/Continental merged with People's Express, Frontier Airlines, and Rocky Mountain in 1987, with operations at Denver Airport. *Note:* The data are from *Airline Competition: Higher Fares and Reduced Competition*, by US GAO, 1990, Washington, DC: US GPO, p. 46, Table 3.14.

Figure 33
United's Hub Premium at Denver Airport: 1984 – 1997



Note: The data are from S. Borenstein's presentation to the Transportation Research Board Study Committee on Airline Competition, Jan. 1999, Table 2, and referenced in *Predatory Practices in the U.S. Airline Industry*, by C. Oster, Jr., and J. Strong, 2001, Bloomington, IN: Indiana University, Table 6 and Appendix B.

more than three times that of the comparison group of 38 unconcentrated airports, it was less than Continental's 87% yield increase over the same period.

Figure 33 illustrates United's hub premium at Denver Airport. Denver Airport, while a Concentrated Airport with United and Continental controlling 87% of the market share in 1988 and 83% in 1992 (US GAO, 1993), also had many New Entrants, including Aspen Airways, Frontier Airlines I and II, MarkAir, Southwest, Trans-Colorado, and Western Pacific. Continental was a weak competitor, with bankruptcies in 1983 and 1991 and, as seen at Atlanta

Airport, a financially weak competitor restrains yields. However, unlike Atlanta Airport, where Delta had the highest yields, United maintained low yields relative to other airlines at Denver Airport including financially weak Continental. Additionally, United failed to use its CRS advantage to increase yields (House Subcommittee *Airline computer reservation systems*, 1988). United was unable to increase its market share at Denver using feeder airline ownership, due to a clause in the contract with its pilots union, a contract that lasted until 1992. United did, however, have an extensive affiliation with commuter airlines to feed its Hub and Spokes through code sharing, co-host status, and other CRS follow-on innovations. Except for a hub premium of 19% in 1996 (see Figure 33) hub premiums at Denver Airport were around 10% or less, a paltry sum compared to other Concentrated Airports. MarkAir, a New Entrant, captured 35.9% of the available seat miles at Denver Airport, further driving down hub premiums (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000). Frontier Airlines II has also become a New Entrant force, as discussed below.

Denver Airport moved to a larger airport in 1995. PFCs financed the airport, including airfield projects, and no gates or other airport real estate were leased for airlines' exclusive use (US FAA/OST, 1999a)(see Chapter 9). New Entrants nevertheless complained to FAA/OST task force members that Denver Airport authorities did not oversee ground handling arrangements, leading to higher fees as they were required to purchase bundled services whether

needed or not (US FAA/OST, 1999a). Denver Airport authorities told the task force that they had sufficient excess space (US FAA/OST, 1999a). In spite of airport authorities' reassurance of ample space, when United contracted during bankruptcy, Frontier Airlines II wanted their gates. Airport authorities and the City of Denver, who own the new airport and must repay \$5 billion in debt, were placed in a difficult position of how best to mediate between New Entrant Frontier Airlines II and Incumbent United. This battle between New Entrants and Incumbents is being replayed throughout the industry as New Entrants seek to grow and Incumbents retrench but still want to retain control of gates and the airport as a whole. With Frontier Airlines II in bankruptcy, airport authorities are caught in the difficult position of deciding which airline to support, reflecting the fragility of all airlines.

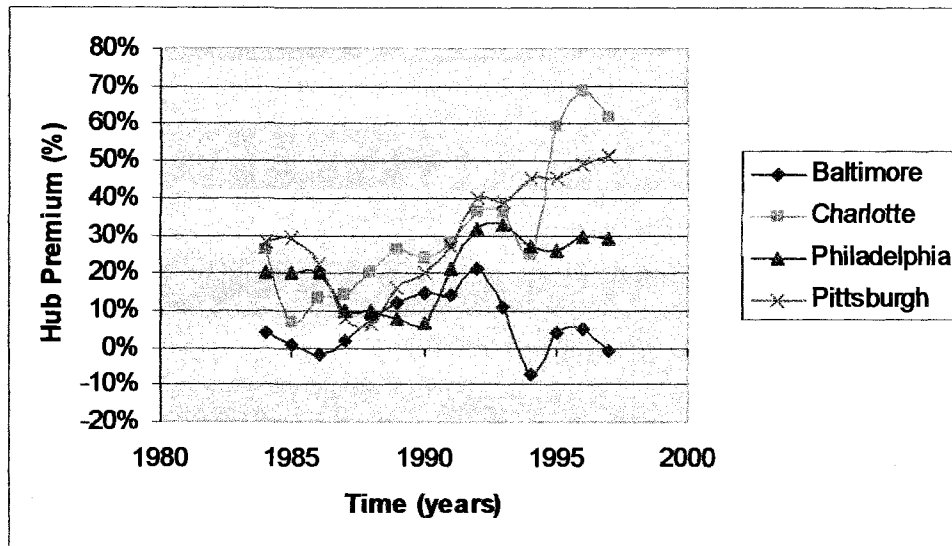
Despite the inability of United to earn a substantial hub premium at Denver Airport, United has sunk substantial capital in its Denver hub since 1979 including improvements to the terminal, increased staff, and a pilots' training center. Denver Airport's fortunes are closely tied to United's as the airline accounts for more than one-half of the 3.02 million passengers in May 2003 and 65% of the airport's \$305 million in income in 2002 from rent, fees, and charges (Wong, 2003). Who then, should the airport authorities assist in their efforts to pay for airport improvements and provide their communities with low fares and multiple airline service?

Denver was a Concentrated Airport, yet United failed to obtain high hub premiums. Denver attracted a large number of New Entrants. While it is possible that Continental and its parent, Texas Air, weakened United's response to competitors, whether Incumbent or New Entrant, the fact remained that United did not respond aggressively (compared to other Incumbents such as American at Dallas Airport or Northwest at Detroit Airport) to New Entrants. Despite the supportive attitude of Denver Airport authorities toward United and the fact that United has potential as a large competitor including control of a dominant CRS, New Entrants freely entered Denver Airport. Yet not one of the New Entrants has succeeded to date. This makes us ponder the question "Why can a New Entrant not even survive a benign Incumbent?"

US Airways at Baltimore Airport

Figure 34 shows the hub premium earned by US Airways at Baltimore, Charlotte, Philadelphia, and Pittsburgh Airports. (Charlotte, Philadelphia, and Pittsburgh are shown here for comparison). Baltimore Airport authorities have encouraged New Entrants, allowing Southwest to enter Baltimore Airport, with the resultant drop in hub premium that is characteristic of the "Southwest Effect." US Airways enjoyed substantial hub premiums at Charlotte, Philadelphia, and Pittsburgh Airports following its merger with Piedmont Aviation in 1987 and the 1991 recession, while Baltimore Airport stands in sharp contrast with declining hub premiums.

Figure 34
US Airways' Hub Premium at Baltimore, Charlotte, Philadelphia, and Pittsburgh Airports: 1984 – 1997



Note: The data are from S. Borenstein's presentation to the Transportation Research Board Study Committee on Airline Competition, Jan. 1999, Table 2, and referenced in *Predatory Practices in the U.S. Airline Industry*, by C. Oster, Jr., and J. Strong, 2001, Bloomington, IN: Indiana University, Table 6 and Appendix B.

Baltimore Airport was never a Concentrated Airport but is in the shadows of nearby slot- and perimeter-controlled National Airport and long-distance Dulles Airport. Concerned that the airport would lose commercial airline service as Incumbents "moved up" to larger airports following Deregulation, Baltimore Airport began soliciting airlines in 1979 and attracted eight New Entrants and competitors — Aeromech, Air Virginia, Icelandic Air, New Haven Airways, North Central Airlines, Texas International, and World Airways — in addition to its eight existing Incumbents (Ott, 1979b). US Airways reacted to New Entrants at Baltimore Airport by deploying its low cost

subsidiary, MetroJet. It is interesting to note that US Airways did not utilize MetroJet at any of its high hub premium airports — Charlotte, Philadelphia, or Pittsburgh Airports. It is also interesting to note that Baltimore Airport authorities treated US Airways' MetroJet as a low cost New Entrant in providing it with PFC-improved airport space. It is clear that Baltimore Airport, unlike other US Airways hubs, is restrained in hub premiums due to airport authority policies that have encouraged New Entrants since Deregulation. Winston found that in 2000 consumers would have benefited overall of about \$3.6 billion if US Airways stopped operating, because its service would have been replaced by low-cost airlines with more frequent service (see Table 24) (Bailey, 2006b). This is confirmed in Figure 34 by the hub premium spread between Baltimore Airport and other US Airways hubs, especially after 1995.

Baltimore Airport authorities discussed their business practices with the FAA/OST task force, which included a limit on sublease cost mark ups, PFCs to build 22 gates and accommodate low-fare New Entrants, monitoring gate utilization, preferential-use leases, and airport control of several gates (US FAA/OST, 1999a). Besides Southwest, Baltimore Airport authorities were able to meet the needs of several New Entrants, including Pro Air, America West, and Frontier Airlines II and US Airways low cost subsidiary, MetroJet, (US FAA/OST, 1999a). Without the PFCs, gate and terminal expansions for New Entrants, opposed by some Incumbents, would have not been possible. Because of the close proximity to National and Dulles Airports, Baltimore

Airport and its low cost New Entrants, particularly Southwest, have an impact on fares in the region. From 1990 to 1998, Baltimore Airport's average fares, adjusted for inflation, declined significantly: 49% for short-haul, 35% for medium-haul; and 38% for long-haul markets (US FAA/OST, 1999a). The four largest airlines at Baltimore Airport controlled 71% of the market, with Southwest at 30%, US Airways at 27%, United at 8%, and Delta at 6% (based on data from *Aviation Daily* on September 24, 1999) (US FAA/OST, 1999a).

Conclusion

We have now reviewed New Entrants and their efforts to compete with Incumbents by using satellite airports. While Southwest is the most successful New Entrant, it overcame great obstacles in its early years, eventually succeeding by avoiding head-to-head competition with Incumbents through the use of satellite airports. Once Southwest gained significant resources, coverage across most of the US, and a reputation for vigorous competition, they developed a policy of mutual forbearance with their competitors, the Incumbents. The government, however, is concerned that Southwest, with its unrivaled success may become a monopolist in the domestic market. Other New Entrants have come and gone with a high failure rate. Only America West, now called US Airways, has managed to survive the turmoil and become an Incumbent in its own right.

New Entrants have tried to survive by:

1. Skimming off price-sensitive customers by flying from one major metropolitan area to another;
2. flying from smaller airports with access to low-cost gates, ticket counters, and other airport real estate;
3. joining Incumbents by becoming feeder airlines, code share alliance airlines, or being subject to a hostile merger (see Chapter 6);
4. emulating Incumbents by creating a Hub and Spoke, only on a smaller scale;
5. flying Point-to-Point; and/or
6. flying as a “no frills,” low-cost airline.

While New Entrants may use a combination of the above strategies, if they are unable to access even satellite airports and the national airspace, then the future for New Entrants and additional competition is imperiled. Chapter 8 will cover in detail the problems of expanding airports and the national airspace, but it is increasingly clear that this avenue for New Entrants is closing. In Chapter 8, we will discuss problems of airport authorities' self interests which make them at odds with opening their airports to New Entrants. Yet, it is clear from the examples provided in this Chapter, that efforts by airport authorities at Atlanta and Baltimore Airports created access for New Entrants and met Deregulation's goal of lower fares for consumers. Finally, a key issue for New Entrants is whether they should compete or cooperate with Incumbents.

Incumbents were forced to give up their regional jets and they, in turn, may become the next New Entrants to compete in the industry.

We will next look at airport factors and government actions that play a critical role in the Hub and Spoke discussion.

Endnotes

1. CAB certificated airlines are those airlines that are authorized to fly within the US by CAB, and may be any sized airline (e.g., Major, national, regional, commuter, air taxi, etc.). Alternatively, an airline may seek authorization from states, such as the Texas Aeronautic Commission (TAC) for Texas intrastate travel, or countries (e.g., foreign airlines such as British Airways and Lufthansa).

CHAPTER 8

GOVERNMENT RESPONSE TO HUB AND SPOKE BARRIERS

The government deregulated only three aspects of the airline industry: entry and exit from markets, scheduling, and pricing. This left most aspects of the industry under government regulation. Not only does the government supply employees who oversee the national air traffic system, air traffic controllers, it provides funding for airports, which serve as the entry and exit points to the national airspace. Through the National Transportation & Safety Board (NT&SB) the government investigates crashes and accidents. The Federal Aviation Administration (FAA) certifies airplanes and equipment. The Environmental Protection Agency establishes environmental laws. The federally mandated EASP ensures that isolated and small communities have scheduled air service. Several branches of the government, including Congress, DOT, GAO, DOJ, and FAA conduct studies and ensure the fair conduct of business. Clearly, the federal government maintains a significant amount of involvement in the airline industry.

While the federal government has primary responsibility for the airline industry, local and state governments are responsible for airports themselves. This chapter will investigate government oversight of airports and its impact on the Hub and Spoke system as implemented by the airline industry. The roles of airport leases, funding, standard operating practices, environmental constraints, and the self interests of airport authorities and airlines will be examined. Large

airports were congested at the time of Deregulation and the role of the FAA in regulating congested and slot-controlled airports is especially critical in this study.

How Airports Operate Fiscally

Airports are owned and operated by states, cities, municipalities, specially created quasi-government entities, such as the Port Authority of New York and New Jersey (PATH), or some combination thereof. For ease, they will all hereinafter be called airport authorities. The mission of any given airport authority is to provide its community with airports from which airplanes, private and commercial, enter and exit the national airspace, under the supervision of the FAA. Airport authorities have a fiduciary responsibility to ensure their operating revenues cover operating costs, that is, they are responsible for a balanced budget. If airport authorities want to build a new airport or expand or renovate an existing airport, they obtain a combination of funds from the federal government's Airport Improvement Program (AIP) or Airport Development Aid Program, with matching funds from state or local governments, general airport revenue bonds (GARB) paid by airlines who rent space at the airports, and Passenger Facility Charges (PFC) paid by passengers.

Pre-Deregulation, airports were one of the industry's most stable environments, according to Raymond G. Glumack, Executive Director of the Minneapolis - St. Paul Airports Commission (Aviation Week & Space Technology, 1980f). CAB assigned one or two airlines route authority to each airport. Airports with too much congestion were designated by the FAA as slot-

controlled with limited entry and exit. As route awards were made in public, after years of administrative review and litigation, airport authorities had ample time to construct airport facilities to accommodate airlines' needs. Airport operating losses were nonexistent as most airport authorities and Incumbents signed residual leases (Residual Leases). Incumbents were responsible for all operating cost shortfalls as well as all airport debt service.

Deregulation brought an onslaught of requests by New Entrants and other Majors, regionals, nationals, and former intrastate airlines who wanted to enter new markets and/or realign their route networks. It also increased demand from Incumbents. These demands meant an increased need for airport real estate such as gates, jetways, aprons, baggage and waiting areas, ticket counters, and administrative space, and services such as, cleaning, food service, and baggage. Slot-controlled airports were in even greater demand, because they were located in densely populated areas. Airport access replaced CAB awarded route certificates as the key resource that limited competitive entry.

Airports have become one of the battlegrounds of US airline deregulation... [including] obtaining landing slots and physical facilities at airports where, in many cases, they are in short supply. ... [Incumbents] which have made large investments in airport facilities, are being threatened by an invasion of new carriers whose right to free and equal access have been championed by government agencies. Therefore, struggles for power continues at all busy airports over when and where airlines may fly and what kind of facilities they may use (Aviation Week & Space Technology, 1980f, pp. 55-56).

Airport authorities have limited means to expand airports and as federal funds continue to decline airport authorities are forced to rely on GARBs.

Raymond G. Glumack, Executive Director of the Minneapolis - St. Paul Airports

Commission said of the airport environment, "... in the aftermath of deregulation 'all is chaos'" (Aviation Week & Space Technology, 1980f, p. 56).

Airport Leases

The airport lease is one of the most significant hub barriers for New Entrants as Incumbents use their leases to maintain Hub and Spoke control. Airports generate operating revenues and expenses and airport authorities can do the following:

1. Move the financial risk to Incumbents with a Residual Lease; or
2. Assume the financial risks with a compensatory use lease (Compensatory Lease); or
3. Use a hybrid lease (Hybrid Lease) with some costs the airport's obligation (e.g., retail) and others the Incumbent's obligation.

Airport authorities have a fiduciary responsibility to protect airport assets and meet the community's needs at a high standard of care. Most airport authorities are therefore risk adverse, and prefer to transfer financial risk to airlines with a Residual Lease. In return, airlines receive lower fees, exclusive use of certain areas, long lease terms with renewal options, and the ability to veto or change any capital projects that increases their debt obligations, using a Majority-In-Interest (MII) clause. Airport authorities and airlines negotiate leases based on standard and customary business and bond practices as described below. As you will see in this review of the practices, there are any number of

ways that an Incumbent can use its lease to obstruct the access of a New Entrant and assure their continued control over their Hub and Spoke.

Residual Leases and the Majority-In-Interest (MII) Clause

Residual Leases transfer the financial risk for operating costs and losses to the Incumbent, also called a signatory lessee (Signatory Lessee). The Signatory Lessee has a direct lease with airport authorities and must meet certain operating thresholds such as a minimum number of flights/day, total payments, and the amount of space leased. A non-Signatory Lessee may be a direct lessee of the airport authority or a sub-lessee of the Signatory Lessee and does not need to meet the established minimum operation thresholds, either because it is small airline or because there is insufficient space to operate enough flights to meet those thresholds.

Residual Leases almost always contain an MII clause which requires the approval by Incumbent(s) of all capital projects because Incumbent(s) assume the airport's debt service obligations for capital projects. Some MII clauses have veto power, long lead times for approval, and modification rights. MII "... clauses protect airline[s] ... from incurring significant rate increases the airlines had not anticipated when they agreed to guarantee certain of the airport's financing and costs" (US FAA/OST, 1999a, p. 51). The Air Transport Association, an airline trade group, said airlines "... [have] an important check on extravagant or unnecessary spending" (US FAA/OST, 1999a, p. 42). Further, this method of financing airport projects was considered "Justifiable [pre-Deregulation] ... to

balance power between airport and airline as potential monopolists" (US FAA/OST, 1999a, p. 42).

The Residual Lease requires Incumbents and other Signatory Lessees to pay for improvements for New Entrants. Incumbents thus experience increased costs and competition and reduced revenues. Airport authorities informed the GAO (1990b, p. 49) that "... airlines were often reluctant to approve projects that would benefit other users," particularly New Entrants and other competitors. MII veto power is a tool for Incumbents and other Signatory Lessees to cooperate in approving or vetoing mutual interest projects. Airport authorities have said that, "... one airline may agree to support a project another airline desires at one airport in order to get the second airline's reciprocal support for a project the first airline wants" (US GAO, 1990b, p. 49). While airport authorities try to project growth and undertake capital projects that take many years to construct, airlines, according to airport authorities, prefer to fund only those projects that address current requirements or when their operations are actually overcrowded (US GAO, 1990b). This is not surprising given airlines' large capital commitments, their high debt to capital ratios (see Chapter 3), FAA required airplane upgrades for noise compliance in 1985 and 1999, and a fuel-inefficient, aging fleet, ranging from an average fleet age of 16 years for Southwest to 35 years for Northwest (Bailey, 2007a).

Sometimes an Incumbent will threaten to block a project to stop New Entrants (US FAA/OST, 1999a). Because airport expansions are time consuming

as well as costly, delays hamper New Entrants, who often wait years to enter a market. Some New Entrants cannot wait years as their stockholders and creditors run out of patience and money. Time is on the side of Incumbents and against New Entrants. Airport authorities have testified to the GAO (1990b) that no New Entrant has been prevented from starting service as a result of an Incumbent's use of MII vetoes. However, airport authorities have admitted that MII approval delays did occur for months or even years, and may have discouraged entry. At least nine of the thirty-six airports and six of eleven Concentrated Airports surveyed by GAO (1990b) had an Incumbent with large enough operations to block a capital project using its MII veto.

Table 27 shows the percentage of lease types with an MII clause at all airports in 1998 (other lease types are discussed later in this Chapter). MIIs are found in 84% of Residual Leases at all airports. Even Hybrid/Other Leases, an

Table 27
Lease Type: Financial and Majority-In-Interest Clauses at All Airports – 1998

Financial Lease Type	Percentage with MII Clause
Residual	84%
Compensatory	20%
Hybrid/Other	74%

Note: large, medium, and small airports, n = 57. The data are from *Airport Business Practices and Their Impact on Airline Competition*, by FAA/OST and Airport Council International – North America, 1999, Washington, DC: US GPO, p. 7, Table 1.4.

Table 28
Lease Type: Financial and Majority-In-Interest Clauses at Large and Medium-Size Airports – 1998

Airport Size	Financial Lease Type	%	MII Clause	%	MII Invoked	%
Large airport (n = 22)	Residual	41%	Yes	65%	Yes	10%
	Compensatory	41%	No	35%	No	90%
	Hybrid/Other	18%				
Medium airport (n = 21)	Residual	19%	Yes	68%	Yes	12%
	Compensatory	38%	No	32%	No	88%
	Hybrid/Other	43%				

Note: The data are from *Airport Business Practices and Their Impact on Airline Competition*, by FAA/OST and Airport Council International – North America, 1999, Washington, DC: US GPO, p. 46, Table 3.5.

effort by airport authorities to move from the two traditional leases, Residual and Compensatory, had MII clauses in 74% of the leases. In an earlier study GAO (1990c) found MIIs greatly limit or delay airport expansions at large and medium-size airports 17% of the time. Table 28 shows the distribution of lease types at large and medium-sized airports in 1998. It further indicates if airports have MII clauses and the frequency in which they are invoked. Regardless of the type of lease at a large or medium-size airport, 65% and 68%, respectively, had MIIs, and approximately 10% to 12% were invoked by Incumbents. Some airport authorities choose not to use MIIs, such as the Massachusetts Port Authority, responsible for Boston Logan International Airport (Boston Airport), and the

Airport Authority of the City of Omaha. Tucson and Nashville airport authorities, on the other hand, believe that MIIs have fostered a cooperative relationship on improvements (US FAA/OST, 1999a). Some airport officials also "... appear to be reluctant to challenge the views of incumbent air carriers as to whether new entry can be accommodated" (US FAA/OST, 1999a, p. 80).

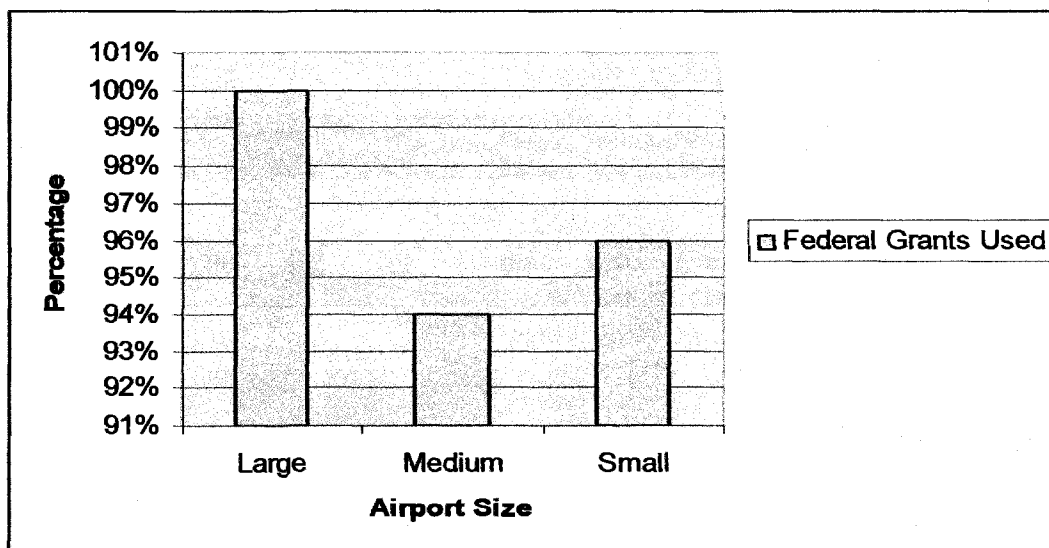
General Airport Revenue Bond (GARB) Financing

Residual Leases and MII clauses were the result of GARB financing that airport authorities use to finance capital projects, and the risk adverse nature of local, state, and municipal governments. "Traditionally, it was considered necessary by the financial community for an airport planning a major improvement or expansion project to have the backing of ... airlines that are signatories of the MII" (US GAO, 1990b, p. 47). Through the use of MIIs, airport authorities received lower interest rates on their debt and were assured that the debt would be paid by Incumbents. Several airport authorities told GAO (1990b) that either they had no source for funding for major projects other than their Residual Leases or that they would have difficulties recovering projects backed by a single Incumbent if the Incumbent defaults on the agreement. MIIs match the life of the bond, often twenty to thirty years. GAO (1990b) earlier reported that over 50% of large and medium airports have MIIs, 79% of Concentrated Airports have MIIs, and 48% of unconcentrated airports have MIIs. Further, 78% of airports dominated by one or two Incumbents have leases that limit expanding

airports for New Entrants (US GAO, 1990b). GAO (1990c) found that where MII is in force, Incumbents received a 3% hub premium.

GAO (1990c) found that the role of the Incumbent was crucial for capital projects greater than \$10 million. Half the airport authorities of the 66 largest airports relied on Incumbents' funds to improve Incumbents' space (e.g., ticket counters, gates) and those same airport authorities relied on Incumbents to back GARBs to improve airport space (e.g., runways, buildings, structures). In the same study, GAO (1990c) found large and medium-size airports used GARBs more than small airports, and large capital projects are more likely to trigger MII clauses. Smaller projects can be internally financed and may not require MII

Figure 35
Airports Reliance on Federal Grants by Airport Size: 1980 – 1989



Note: The data from Airline Competition: Passenger Facility Charges, by US GAO, 1990, Washington, DC: US GPO, Attachment I, p. 18.

Table 29
Sources of Airport Capital Funding (\$ billion): 1990 – 1996

Funding Source	1990	1991	1992	1993	1994	1995	1996
GARB ^(a)	\$4.6	\$3.2	\$4.8	\$1.6	\$3.0	\$3.2	\$4.0
AIP ^(b)	\$1.4	\$1.8	\$1.9	\$1.8	\$1.7	\$1.5	\$1.5
PFC ^(c)	NA	NA	\$0.1	\$0.5	\$0.8	\$1.0	\$1.1
State/Local Grants ^(d)	\$0.5	\$0.5	\$0.5	\$0.5	\$0.5	\$0.5	\$0.5
Total	\$6.5	\$5.5	\$7.3	\$4.4	\$6.0	\$6.2	\$7.1

Note: (a) GARBs are tax-exempt, general airport revenue bonds = 36 - 70% of capital expenditures per year; (b) AIPs are the federal government's Airport Improvement Program to expand, renovate, or build airports = 21 - 40% of capital expenditures per year; (c) PFCs are Passenger Facility Charges paid by passengers who use specific airports = 15% of capital expenditures per year; and (d) 7 - 11% of capital expenditures per year. The data from "America's Future in Airport Infrastructure," by *Airport Business Practices and Their Impact on Airline Competition*, by FAA/OST and The American Association of Airport Executives, 1999, Washington, DC: US GPO, p. 4, Table 1.2.

approval. The MII veto, as shown in Table 28, was used by Incumbents 10% of the time at large airports and 12% at medium-size airports in 1998.

Figure 35 shows the percentage of airports that relied on federal grants to fund major capital projects from 1980 – 1989. 100% of large airports used federal grants, as opposed to 94% of medium-size airports, and 96% of small airports. Not only were most airports subject to Incumbents' MII approvals for GARBs, but almost all airports, regardless of size, needed federal grants to expand their airports to accommodate New Entrants and growth.

Table 29 provides the sources of capital funding for airport expansion and renovations. As can be seen in Table 29, the major source of funding is from GARBs that are backed by Residual Leases and MILs. AIP funds from the federal government are the next largest source of capital, but require matching funds from state or municipalities, often in the form of GARBs. As will be shown later in this Chapter, passenger facility charges (PFCs) are increasingly becoming an important source of capital for airports. In fact, Denver Airport, the first new US airport since the 1980s, was entirely funded by PFCs. Hence, we see a declining role of the federal government in airport infrastructure and an increasing reliance on GARBs and PFCs.

Compensatory and Hybrid Leases

Compensatory Leases are leases where airport authorities assume financial risks and rewards for non-airline real estate, such as retail space, parking garages, and car rental space (US FAA/OST, 1999a). Incumbents and other airlines pay a rental fee for each gate rented, but airport authorities may not recover costs from non-airline real estate operations. Airport authorities are motivated financially to get additional tenants to defray costs and earn profits (US FAA/OST, 1999a).

Hybrid Leases or “cost center” approach leases exclude certain non-airline activities from the residual cost pool such as an airfield. This reduces the airport authorities’ financial risk regardless of competitive or cyclical trends of the industry or the economy (US FAA/OST, 1999a). Thus, while both the

Compensatory and Hybrid Leases do not ensure the airport authority against operating losses, it is important to note that the MII clause is prevalent in most airport leases (see Table 27).

Appendix G lists the lease information for five slot-controlled airports (JFK, La Guardia, National, Newark, and O'Hare Airports); five Concentrated airports (Charlotte, Cincinnati, Detroit, Minneapolis, and Pittsburgh Airports); and three other airports included in this study (Atlanta, Dallas, and Salt Lake Airports), as of 1998. Of the thirteen airports in this study, four had Residual Leases, five had Compensatory Leases, and four airport authorities failed to report on the type of leases at their airports.

Lease Term

Lease terms range from twenty to thirty years, with an average term of twenty-five years, plus renewal options (US FAA/OST, 1999a). Renewal options are the right of Incumbents to renew their lease under certain terms and conditions and thus maintain a presence at an airport for years. If an airport authority and Incumbent agree to a major renovation a new lease is often negotiated that ensures the Incumbent can earn a profit on its investment. Leases are legally binding agreements and are changed by amendment, subject to lenders, insurance carriers, and the airport authority and airline's management approval. Leases carry over proscribed business practices from the pre-deregulated to the post-deregulated eras. "Some airports support long-term, exclusive use lease arrangements, since they have historically relied on the

backing of a specific airline tenant to finance the construction of new and improved facilities" (US FAA/OST, 1999a, p. 40). For example, US Airways entered into a long-term, exclusive lease at Pittsburgh Airport so that the airport authorities could secure its debt for a new terminal. The Maryland Aviation Administration believed long term leases offered the security of knowing that construction cost will be repaid. Orlando Airport authorities had all Signatory Lessees agree to pay rates and charges so their bonds were satisfied. Charlotte, Cincinnati, and Minneapolis Airport authorities have attested that it is in their best interest to lease gates for a long term to maintain stable revenues. In fact, Cincinnati Airport authorities said they depend on Signatory Lessees to pay their debt obligations, and Delta, with 50 of their 68 gates, financed the construction of 43 (US GAO, 1999a). The Air Transport Association defended long term leases, saying they provide airlines assurance that substantial financial improvements to airports can be used over long periods (US FAA/OST, 1999a). Even after an airport lease expires, traditional "carryover" practices allows the expired lease's terms and conditions to continue until a new lease is negotiated, sometimes years later (US GAO, 1990c).

Generally accepted accounting principles (GAAP) require capital improvements to be depreciated over the unexpired lease term and the Deregulation Act required airlines to amortize route acquisition costs over forty years, beginning in 1979. For American, that cost was over one billion dollars (American Airlines, 1979). Heightened concerns over depreciation and

amortization costs, which affect balance sheets and access to capital, increased, leading Incumbents to continue to demand long lease terms. These long lease terms assure an Incumbent's control of their Hub and Spokes.

In 1988, 87% of airport leases were for terms longer than two years, 60% for terms longer than ten years, and 35% for terms longer than twenty years (US GAO, 1990b). At Concentrated Airports, 53% of the gates had lease terms longer than twenty years (US GAO, 1990b). Appendix G shows lease expirations in 1998 for five slot-controlled, five Concentrated, and three other airports included in this study. Cincinnati's lease term is particularly long and is linked to the construction of 43 gates for Delta. It is notable that even 20 years after Deregulation, lease terms remain long. These long lease terms, as well as the clauses contained in the leases and described below, impede change at airports and within the industry. At the same time, these lease terms and clauses appear to provide airport authorities and bond markets financial stability, a critical element during times of financial crises.

Exclusive Use Lease Clause

Exclusive use clauses allow Incumbents to control airport space, even if it is not used. Areas such as gates, ticket counters, passenger waiting areas, and baggage areas are constructed and equipped with proprietary equipment. Incumbents spend millions of dollars on these improvements, expecting to recover these improvements through profits made at the airport or through its Hub and Spoke. Before Deregulation there was no expectation that Incumbents

make large capital improvements to share it with competitors. Gates, for example, are needed to access airplanes and enplane passengers. Without gate access at appropriate times and in sufficient numbers, an airline cannot serve an airport. Alternatives to exclusive use gates are preferential use gates and airport controlled gates. The former is a gate that the Incumbent has the right of first usage and when not needed, the gate is available to other airlines. An airport controlled gate is controlled by airport authorities and can be rented to any airline. At the time of Deregulation only exclusive use gates existed.

An analogy for exclusive use clauses is if a person leases a house that s/he uses only during the summer. Does that person have the exclusive use of that house, including her/his improvements, equipment, and furniture, as long as s/he pays rent and abides by the lease?

In 1988, 85% of large and medium-size airports had exclusive use gates compared to 90% of only large airports and 89% of Concentrated Airports (US GAO, 1990b). In 1990, 66 of the largest airports had 85% of their gates leased to Incumbents under a long-term, exclusive use lease (US GAO, 1996). In 1998, airports included in this study (see Appendix G) had 77% of their gates as exclusive use, 16% preferential shared gates, and 7% under airport control. Large airports reported they planned to have about 40% of their gates exclusive use by 2004, down from 63.2% in 1992 and 55.7% in 1998 (US FAA/OST, 1999a).

In response to New Entrants and government's complaints about exclusive use gates, airport authorities can negotiate a minimum usage clause. For example, Atlanta airport authorities increased the minimum usage of gates before it allowed Delta to acquire additional gates following Eastern's bankruptcy. GAO (1990c) found that the larger an Incumbent's share of gates, especially if the gates are long-term exclusive use gates, the higher the Incumbent's fares.

Recapture Clause and Subleasing

At the time of Deregulation, large and medium-sized airports were at capacity and there was no excess space. In fact, airport authorities' fiduciary responsibilities would be questioned if they left airport space vacant and not earning revenues to pay off bond debt or operating expenses, as required by Residual Leases. Airport authorities had no space under their control to accommodate New Entrants. Further, most airport authorities do not have the right of recapture whereby they can force Incumbents to forfeit or share facilities that is otherwise unused. Even if airport authorities have the right of recapture, it is difficult to match a New Entrant's needs with an Incumbent's excess space to reach a mutually acceptable sublease agreement. Incumbents do not want to open their Hub to competitors, which increases competitive pressures and decreases revenues. Incumbents therefore reluctantly agree to sublease their airport real estate to New Entrants and devise many ways to obstruct, delay, or refuse to cooperate. For example, most airport leases allow Incumbents to hold excess gates they do not need for currently scheduled operations (US GAO,

1990b). While illegal, Incumbents may tie ground services to sublease agreements, charging excessive fees. Employees from different labor unions or non-union employees may be forced to work in the same area, causing labor problems for both parties. Incumbents could take months or years to respond to New Entrants' request to sublease space. Despite Airport Compliance Requirements FAA Orders 5190.6A, and 5190.6A ¶¶3-1, ¶¶3-9A, ¶¶3-9c(2), ¶¶4-13a, ¶¶4-13b, and ¶¶4-15d (see Appendix C for a list of laws, regulations, and court cases governing airports) airport authorities were unable to aid new entry at congested airports.

Mutual Self-Interest

Another important hub barrier is the mutual self-interest of airport authorities and Incumbents to aid each other in a chaotic environment. These parties often share a feeling of partnership, a belief that it is in their best interests to work collectively together, or, at worst, to allow inertia and standard airport and bond practices to continue despite deregulation. GAO found, "Many airports have adopted lease and management practices that may effectively cede control over their airport facilities to the dominant carrier" (US FAA/OST, 1999a, p. 29). Critics of leases, especially MILs, call them "a willful anti-competitive practice because they allow the incumbent airlines to maintain dominance by barring both access to existing gate space and construction of new airport facilities" (US FAA/OST, 1999a, p. 39). For example, the FAA felt that PATH, responsible for JFK, La

Guardia, and Newark Airports, allows “dominant carriers to control capital development at the airport” (US FAA/OST, 1999a, p. 43).

Self interest leads airport managers and authorities to ensure that their airports do well financially and that their communities have access to frequent and extensive routes. This is the airport authorities’ mission and reason for existence. It is therefore not surprising that many airport authorities consider their role as a cooperative venture with Incumbents. Their line of thinking follows thus: if Incumbents do well financially, so will the airports serving those airlines and the community. The FAA found, “Every airport official interviewed for this study stated that no air carrier that wished to serve his or her airport had been denied access” (US FAA/OST, 1999a, p. 69). Yet, competitive entry would harm an Incumbent with reduced revenues. In that same study, the FAA found, “...some airport officials are more comfortable adopting a ‘let-the-carriers-work-it-out’ approach to new entry than they would be serving as ‘ombudsmen for competitors’” (US FAA/OST, 1999a, p. 69).

Charlotte Airport, a Concentrated Airport, epitomizes the partnership between airport authorities and US Airways, its Dominant Airline. “Airport officials regard US Airways as a ‘partner’ and contend that the Charlotte metropolitan region receives more air service and enjoys important economic benefits because of US Airways’ hub operations” (US FAA/OST, 1999a, p. 72). Further, airport authorities believe “... Charlotte enjoys the benefits of a large, single-carrier connecting hub operations at what would otherwise be a medium hub

airport" (US FAA/OST, 1999a, p. 72). To ensure US Airways' dominant position at Charlotte Airport, airport authorities maintain a neutral position towards New Entrants (US FAA/OST, 1999a). Charlotte Airport has one of the highest hub premiums of all Concentrated Airports (see Chapters 6 and 7).

Norfolk International Airport (Norfolk Airport) in Virginia, sought control of National Airport's slots when United and National Airlines stopped flying to Norfolk. The shock of losing air service made Norfolk Airport establish a trade development office. Officials visited airlines and gave financial aid to establish gates or other needs (Ott, 1979b). Paul G. Caplan, Norfolk Port and Industrial Authority Commission Chairman, said, "The problem comes ... when your community looks good on Monday, but two weeks later, somewhere else looks better. There is real difficulty in getting the carriers to make a commitment ... due to the fluidity and erratic nature of deregulation" (Ott, 1979b, p. 25). Baltimore Airport officials, also fearful of losing air service and in competition against National and Dulles Airports, met with Agents and traffic managers. Baltimore Airport spent \$125,000 in 1979 for promotions. Baltimore Airport became home to eight new airlines, Piedmont Aviation, North Central Airlines, Icelandic Air, Texas International, World Airways, Air Virginia, New Haven Airways, and Aeromech, for a total of sixteen airlines (Ott, 1979b). Ultimately, Baltimore Airport attracted Southwest (see Chapter 7).

Lastly, as the number of Incumbents shrink, whether by merger, alliance, or bankruptcy, it is increasingly difficult for smaller and medium-size communities

to maintain crucial air services. Incumbents and New Entrants responded to historically high oil prices, housing and liquidity crisis, and 2008 recession with fewer domestic flights. American proposes to cut domestic capacity beginning in the Fall of 2008 by between 17 – 18% (Maynard, 2008c) and even Southwest has cut flights in California despite the threat of New Entrant, Virgin America. As a result, not only are large and medium-size cities trying to maintain scheduled commercial airline service, smaller cities are finding their service eliminated despite the EASP subsidy program (Maynard, 2008a). EASP does not provide enough money to cover costs and the public has come to expect frequent, convenient, high-quality service with great connectivity to the rest of the world, according to Robert W. Mann Jr., an industry consultant in Port Washington, NY, but they are unwilling to pay the price for that service (Maynard, 2008a).

Deregulation, subsequent regulations, and court rulings require unlimited competitor airport entry but no method to pay for airport expansions to accommodate those requests. Demands for airport access and countervailing demands by Incumbents put airport authorities in difficult positions that often conflict with their self interests.

Factors in Hub and Spoke Development, Diffusion, and Dominance

We have seen how leases, as legal documents, make airport real estate inaccessible for years while Deregulation demands airport space be provided to any "ready, willing, and able" competitor. At Deregulation, airports did not have excess space to accommodate new competitors, and most airports were already

full or slot-controlled because of excess congestion. Expansion of airport space takes years, including obtaining financing. Now that we have reviewed the basic tools Incumbents use to block competitor entry as well as the limitations that airport authorities face in trying to expand space, we shall turn to the crises that led to the development and diffusion of the Hub and Spoke as an innovation and the acts of airport authorities in that development.

Crisis: Environmental Constraints

Environmental considerations and competitive entry became one of the first arenas in the battle over airport access. Airports must comply with local and state laws for planning, building codes, labor laws, environmental concerns, etc. The federal government may impose higher standards, such as targets for energy usage and emissions, or entirely new standards such as protection for endangered species. Of course, federal laws take precedence. Take for example, the New York and Washington D.C. areas which completed a protracted battle over the Concorde super-sonic airplane on issues of noise, pollution, safety, and traffic. While PATH was found to have unreasonably delayed and discriminated against the British Airways Board (see *British Airways Board v. Port Authority of NY* 564 F. 2d 1022 (2nd Cir. 1977) in Appendix C), nevertheless it was successful in limiting the Concorde's flights. From that case the federal courts established a standard for denying New Entrants airport access: an airport must be demonstrably congested or there must be a significant safety, noise, or environmental concern.

California has led the country in environmental laws with strict noise and pollution criteria at airports. In *Hughes Airwest v. Pacific Southwest Airlines*, noise rules at Burbank-Glendale-Pasadena Airport (Burbank Airport) were found not to discriminate against Hughes Airwest in denying it access in 1980. Hughes Airwest subsequently went bankrupt due to its inability to access Southern California markets and merged with Republic. California courts established environmental criteria, including congestion, traffic, pollution, and sound, as acceptable criteria for airport authorities to deny access to New Entrants (*Aviation Week & Space Technology*, 1980b). Two Southern California airports, Burbank Airport and Long Beach/Daugherty Field Airport (Long Beach Airport) operated under court orders that effectively eliminated new entry due to noise controls (*Senate Subcommittee Barriers to competition in the airline industry*, 1989). Seven other airports use a noise budget, whereby the New Entrant must buy "noise rights" from Incumbents to fly into a restricted airport, but Incumbents are unwilling to sell either because they need them for their own flights or to restrict new entry.

During negotiations with Incumbents and New Entrants, airport authorities must be careful of any anticompetitive implications (Ott, 1979b). San Francisco Airport found itself in conflict between local, state, and federal laws. Its airport commission established an interim policy to restrict New Entrants while complying with phased-in airplane noise standards and state environmental laws:

As they did in a similar situation at San Diego, the FAA and CAB branded the policy as discriminatory and threatened the airport with a loss of

federal funds if it persisted in pursuing it. [San Francisco Airport] ... commission ... point[ed] out to the CAB and FAA that the airport is caught between noise requirements of both the state and federal governments, and the free market entry provisions of the deregulation act (O'Lone, 1979, p. 29).

New Entrants usually leased or bought older, noisier airplanes. These airplanes were more readily available and cost less, especially after the DC-10 crash and high fuel cost increased demand for new airplanes. If San Francisco Airport allowed access to New Entrants with noisy airplanes, it would not comply with state and FAA airplane noise deadlines. Philip J. Bakes, CAB's general counsel, stated San Francisco Airport's interim policy conflicted with the federal policy of requiring airlines to begin operating quieter equipment by 1981 and to have their entire fleet in compliance by 1985 and said,

If the San Francisco airport ... or any other airport enforces more stringent equipment requirements, there would be a conflict with ... regulation ... and ... would probably be a serious disruption in interstate air service because planes lawfully departing from... New York or Denver would not be able to land in San Francisco (O'Lone, 1979, p. 29).

Adding to the confusion of San Francisco Airport authorities was National Airport's noise prohibition. The FAA said National Airport's policy was not discriminatory since noisier airplanes could fly to nearby Baltimore Airport or Dulles Airport. Since San Francisco Airport was located near Oakland Airport and Mineta San Jose International Airport, it believed it should receive the same exemption as National Airport. San Francisco Airport authorities eventually resolved the New Entrant access issue by building a new airport terminal that provided more space. Also, as Incumbents suffered from recessions and

bankruptcy, they abandoned airport space that could be rented to New Entrants. This resolution, however, took decades.

San Diego Airport was another airport overwhelmed by airlines seeking access. North Central Airlines sought routes from Minneapolis to San Diego, received CAB approval three times, and was denied by airport authorities each time. There are twenty-nine California agencies involved in approving airport expansions. "Faced with the threat of continual court action over possible violation of California's strict noise and pollution laws, ... [San Diego Airport] banned further access to the airport, an action that stunned the CAB" (Ott, 1979b, p. 26). William L. Dick, Director of Community and Government affairs for the San Diego Port District and airport authority said airport problems become insurmountable due to conflicting laws and regulation, and consumer advocacy (Ott, 1979b). Mr. Dick felt the overriding issues were safety and crowded airports that threatened the nation's air transportation system. J. Donald Reilly, EVP of the Airport Operators Council International, said the airport industry was coming to a consensus on how to handle its capacity and access problems, but was awaiting guidance from Washington. Despite Mr. Reilly's assertion, airport authorities were concerned that they would be confronted with conflicting demands by stakeholders, particularly regulators, with no resolution:

... airport operators... are carefully watching maneuvers by government agencies that are themselves uncertain how to handle deregulation... Airport operators believe federal controls over airports, greater than anyone in government now cares to admit, are inevitable as traffic grows and environmental constraints increase, tightening the squeeze on airport gates, counter space and slots (Ott, 1979b, p. 24).

One half of the sixty-six largest airport authorities told GAO (1990c) that funding, environmental studies, noise mitigation, lack of highway access roads, airline opposition to expansion projects, and limitations of the air traffic control system delayed or limited their ability to expand capacity (US GAO, 1990c). Airport noise was an issue that Congress and the FAA continually attempted to mitigate. The FAA issued orders in the 1970s requiring the reduction of Stage II airplanes by 1985 (American Airlines, 1977). The Airport Noise and Capacity Act of 1990 imposed restrictions on Stage III airplanes so that 65% were eliminated by 1996 and 100% eliminated by 1999 (US FAA/OST, 1999a). The Airport and Airway Safety, Capacity, Noise Improvement, and Intermodal Act of 1992 also sought to reduce airport noise. Boston, Denver, and Minneapolis Airports have noise budgets or caps; Boston and Love Field Airports require a higher proportion of quieter airplanes than the industry as a whole; and National Airport and Long Island MacArthur Airport in NY limit flights 24 hours a day, 7 days a week.

There is, unsurprisingly, more opposition to airport expansion at large airports than medium or small-sized airports (US GAO, 1990b), and large Concentrated Airports are more likely to limit noisy planes. Eighteen of twenty-six large airports and seven of fourteen Concentrated Airports faced community opposition to expansion (US GAO, 1990b). Three types of noise control programs evolved at nearly all large and medium-size airports:

1. Land use strategies, including zoning and building restrictions, soundproofing buildings adjacent to airports, guaranteeing the purchase of nearby homes, and buying land around airports;
2. direct flights away from homes, particularly at night, with preferential runways; and
3. restrict types and numbers of airplanes used, which creates a differential effect of airlines operating at the same airport.

The last control measure provides Incumbents with benefits not available to New Entrants, particularly since noisier airplanes are more readily available and less expensive for New Entrants, while quieter airplanes may take years to order and receive. Where noise budgets or caps are agreed to by airport authorities and neighbors, they are based on historical usage at the airport by Incumbents, shutting out New Entrants who have to purchase noise budget allocations. Finally, airplanes that meet less stringent noise restrictions at one airport may not be able to fly to an airport with greater noise restrictions. The GAO was concerned that this inconsistency in noise control programs throughout the nation could make it difficult for the airlines to schedule the use of their airplanes efficiently, could substantially raise the cost of providing service, and "...constitute a potential barrier to competition when they treat Incumbents and entrants differently or limit the use of the types of aircraft that might be more readily available to entrants" (US GAO, 1990b, p. 55).

While the Secretary of Transportation's Task Force on Competition in the U.S. Domestic Airline Industry found, "... there could be a serious barrier problem if local rules restricting the operations of specific aircraft were to proliferate" (US GAO, 1990b, p. 59) the Task Force concluded, "...based on rules currently in place, that local environmental regulations do not represent a serious barrier to entry" (US GAO, 1990b, pp. 59-60). The Task Force's conclusion was based on that fact that some metropolitan areas have alternative airports that travelers can use, though they may not be as convenient as the noise-restricted airport (using the National Airport policy previously cited).

Thus, airport authorities, Incumbents, New Entrants, federal regulators, states, and local governments found themselves in an intractable position of how to expand airports, particularly those located in densely populated locations or in environmentally sensitive locations. Incumbents already located in such sought after airports were allowed to continue to operate while New Entrants were blocked from entry. Incumbents were able to enjoy the benefits of incumbency, including above industry rents. As will be shown later, access to key airports through mergers and alliances, particularly at slot-controlled airports, quickly became the strategy of both Incumbents and New Entrants. Bitter battles continue to this day over expansion of airports such as San Francisco Airport's request to expand into San Francisco Bay. To resolve conflicts between environmental laws and the need for entry at airports, the federal government

and courts issued a number of rules, regulations, and rulings that are described below.

Crises: Federal Regulations and Court Rulings

Federal regulations, legislation, and court rulings evolved (see Appendix C) over time to resolve conflicts of federal and state laws, including environmental laws and the right of New Entrants to gain access to airports. While state, local, and municipal governments have authority and responsibility for airports, the federal government retains primary control over interstate commerce.

1. Airports have limited proprietary powers to impose reasonable and non-discriminatory restrictions on the use of an airport (49 U.S.C. 41713(b) (3)). Those restrictions, however, must not be unduly burdensome to interstate commerce, and can only be legitimate state objections that do not conflict with the Deregulation Act and its related statutes (14 CFR 399.110 (1997)).
2. The Deregulation Act places “maximum reliance on competitive market forces and on actual and potential competition” consistent with the public safety (49 U.S.C. 40101(a)(6)).
3. Any state or political subdivision is prohibited from enacting or enforcing any law, rule, regulation, standard, or other provision having the force and effect of law relative to rates, routes, or services of air carriers providing transportation (49 U.S.C. 41713(b)(1); 49 CFR 399.110(a)

(1997); *Morales v. Trans World Airlines, Inc.* 504 U.S. 374 (1992); and *NY Airlines, Inc. v. Dukes County* 623 F. Supp 1434 (D. Mass, 1985)) (US FAA/OST, 1999a).

Airport authorities' rights are carved from federal government's powers, who:

1. May exercise proprietary rights and powers, but those rights are circumscribed. The rights must rationally and demonstrably be related to protecting the safe and efficient operation of the airport or relieving noise or congestion at an airport, including eliminating hazards to aircraft and people on the ground. The authority must establish minimum standards for engaging in commercial activity and those standards must be relevant to the proposed activity, reasonably attainable, and uniformly applied. These conditions must be fair, equitable, reasonable, not unjustly discriminatory, non-arbitrary, and justified (Order 5190.6A, ¶3-12; Grant assurance 22h).
2. May prohibit or limit any given type, kind, or class of aeronautical use of airport if necessary for the safe operation of airport (Grant assurance 22i) which includes the restricting of Stage III aircraft to alleviate demonstrated noise and environmental impacts, subject to FAA approval (Airport Noise and Capacity Act of 1990).
3. Must be reasonably consistent with reducing non-compatibility of land uses around the airport.

4. **May impose certain use restrictions for congestion problems.** If the authority owns a multi-airport system, it may designate certain airports for use by a particular class of airplane. The authority must assure that all classes of aeronautical needs can be fully accommodated within the system without unreasonably penalizing any class and be beneficial to the overall system capacity (Order 5190.6A ¶4-8d).
5. **May make reasonable efforts to accommodate New Entrants with airport real estate or the ability to obtain real estate.** However, the authority must not protect Incumbents; must not relinquish control of airports to Incumbents; and must not deny signatory status to an airline that assumes the obligations established for signatory status, particularly if the ability to meet signatory status is hindered by airport policy or lack of facilities. Access for all New Entrants must be to all facilities, including parking, loading bridges, hold rooms, ticket counters, and baggage make up areas (FAA Order 5190.6A, ¶4-13a (1985); 5190.6A ¶4-15(d) (1989); 49 U.S.C. 47107(a); Airport Compliance Requirements (1989)).
6. **Must not ban or delay access in excess of about two years** (FAA Order No. 1999-1, Feb 18, 1999 (Arapahoe County Public Airport Authority v. FAA, Case No. 99-9508 (10th Cir))).
7. **Must assure terms imposed, including rates and charges, are fair, reasonable, and applied without unjust discrimination, including to foreign carriers.** However, the authority may make reasonable classifications

between a lessee and a non-lessee and signatory and non-signatory lessee and may impose different charges, regulations, and conditions. The authority must assure subleases are nondiscriminatory and provide reasonable access. The authority may intercede in sublease negotiations and be more proactive in encouraging new entrants (49 U.S.C. 47107(a); 49 U.S.C. 47107(a)(2); 49 U.S.C. 47107 (a)(2)(B); Order 5190.6A¶4-13b). The authority must assure there is no economic discrimination (FAA Airport Compliance Requirements Order 5190.6A (1989)).

8. May not grant an “exclusive right” to conduct a particular aeronautical activity (49 U.S.C. 40103 (e) and 47107(a)(4) and Grant assurance 23, 62 FR 29761 (1997)). “Exclusive rights” limit the usefulness of the airport and deprives the public of benefits of a competitive airport (FAA Advisory Circular 150/5190-2A, ¶7 (1972)).

9. May not grant any special privilege or monopoly in the use of public airport facilities (FAA Order 5190.6A, ¶3-1).

10. Must assure ground handling arrangements do not hinder New Entrant or non-signatory lessee and are reasonable and non-discriminatory but reasonable safety standards can be imposed (FAA Order 5190.6A, ¶3-9e(3)).

11. May use exclusive-use, long term leases as long as there is no understanding to exclude other reasonably qualified airlines, however, the

use of such leases should be limited to "as is demonstrably needed" (5190.6A ¶ 3-9A and ¶ 3-9c (2) (1989)).

12. Must not have Sherman Act, Section 1 violations for either tying ground services to subleases or exercise of MII lease clauses to block airport expansion projects.
13. Must not have Sherman Act, Section 2 violations in the Essential Facilities Doctrine (15 U.S.C. 1 et. Seq.; MCI Communication v. American Telephone and Telegraph Co. 708 F 2d 1081, 1132-33 (7th Cir 1983) and Delaware and Hudson Ry v. Consolidated Rail Corp. 902 F. 2d 174, 179-180 (2nd Cir 1990)) (US FAA/OST, 1999a).
14. May not create an undue burden on interstate or foreign commerce.
15. May not unjustly discriminate.
16. May not derogate safety or adversely affect the safe and efficient use of airspace.
17. Must meet both local needs and the national air transportation system to the extent practicable.
18. May not adversely affect other FAA laws or powers.

The intent of these rules, regulations, and court rulings is that federal laws, and in particular the Deregulation Act and its related statutes, establish the framework for airport authorities and their operations. The federal government views themselves as the sole arbiter of airlines' rates, routes, and services, and interstate and foreign commerce, and places maximum reliance on competitive

market forces and on actual and potential competition. The antitrust laws, particularly the Sherman Act, will be covered in Chapter 9.

Because airports are local, subject to the peculiarities of its geographical location, noise, congestion, building codes, planning laws, and safety issues, the federal government recognizes that carve outs from federal oversight are necessary. Those carve outs include safety, efficiency, eliminating hazards, limiting certain types of airplanes for safety, noise and environmental impacts, and aiding the overall air transportation system. However, airport authorities must make reasonable, rational, justified, minimum standards, that are relevant to the proposed activity, and ensure that the standards are non-arbitrary, non-discriminatory, equitable, reasonably attainable, uniformly applied, and not an undue burden on interstate or foreign commerce.

Airport authorities are prohibited from protecting Incumbents at their airports and may not relinquish airport control to Incumbents. Exclusive-use, long term leases are not prohibited so long as there is no understanding between the airport authority and Incumbent to exclude other qualified airlines and should only be used "as is demonstrably needed." Airport authorities may not grant an "exclusive right" for a particular aeronautical activity. Airport authorities must ensure that subleases between Incumbents and New Entrants are non-discriminatory and provide reasonable access including ground services. Airport authorities are urged to actively intercede in sublease negotiations. These rules,

regulations, and rulings were in response to Incumbents' efforts to control their Hub and Spokes and New Entrants' efforts to enter airports.

Crisis: Small Cities and the Essential Air Service Program

Congressional leaders were concerned that small cities and isolated communities were vulnerable to losing commercial air service while drafting the Deregulation Act. Lawmakers insisted that a convenient system of service for small communities and isolated areas be maintained with subsidies if necessary. This idea later became the Essential Air Service Program (EASP) (Standard & Poor's, 1979a). Legislators knew that CAB cross subsidized short routes to lightly populated cities with long routes to densely populated cities and were convinced that Incumbents would drop service to their small and isolated communities, which indeed occurred. To qualify for EASP, towns had to have scheduled commercial air service as of October 1978; be at least 70 miles from a large or medium hub airport; and be able to attract service from a regional airline with a capped subsidy. For towns more than 210 miles from a large or medium hub airport there is no subsidy cap (Bailey, 2006c).

With the wholesale departure of Incumbents and airlines from small cities, Senator Byrd of West Virginia said he would not have voted for Deregulation had he known how extensive his state's loss of air service would be. Not only was there loss of Incumbents, replacement commuter airlines such as Aeromech, which replaced Allegheny Airlines (soon to be part of US Airways), were unable to access National Airport from Parkersburg, Morgantown, and Clarksburg, West

Virginia (Ott, 1979a). Incumbents, not new commuter airlines, had control over National Airport's slots. Senator Barry Goldwater of Arizona took exception to President Carter's handling of airline issues saying, "1977 was a year of man-made disasters for US aviation. It brought Bermuda 2 [bi-country agreements], Freddie Laker [trans-Atlantic low fares] ... and something called airline regulatory reform ... Senators [have] deep misgivings about tinkering with the finest air transportation system in the world" (Aviation Week & Space Technology, 1978, p. 11).

Incumbents faced severe public and private criticism for abandoning long-served cities and communities. The Hub and Spoke, a radical innovation, and feeder airlines, a follow-on innovation, were a response to that crisis. The Hub and Spoke allowed an additional route to be added to the Hub at a relatively low cost, which could be serviced by a feeder airline. CRSs and its follow-on innovations allowed for the easy coordination of flight schedules, ticketing, and baggage transfers (see Section 2). Increasing the number of flights to the Hub and Spoke has a geometric impact on the number of city-pairs an airline serves through its hub; increases the number of possible destinations; and increases the number of passengers per flight. Hub density reduces unit costs since airlines can use larger airplanes and fill a higher percentage of its seats (Brueckner & Spiller, 1994; Caves et al., 1984; US Congressional Budget Office, 1988). The Congressional Budget Office (1988, p. 25) concluded, "A carrier has to be fairly large in order to operate a hub at a major airport, because it must offer relatively

frequent service in a large number of cities.” By adding a second hub, an airline could reduce its cost at its primary hub, as well as add flexibility in scheduling flights. The GAO concluded (1990a, p. 23) Hub and Spokes “... make it easier for travelers to secure flight[s] departing and arriving at times that match their preferred departure and arrival times. Increased frequencies have a positive impact on traveler welfare.” Thus, Incumbents were able to address criticisms to their abandonment of smaller cities by linking them to their Hub and Spokes, using feeder airlines, and establishing the Hub and Spoke as the dominant form of route network.

Crisis: Congressional Actions

Numerous bills were introduced in 1997 - 1998 to make the airline industry more competitive. Such bills included assistance to help start-up New Entrants attack Incumbents' hubs; loan guarantees for New Entrants to buy small airplanes; special boards to review complaints of predatory pricing practices; forcing Incumbents to release slots; and DOT guidelines to curb “dumping” seats, which is the selling of deeply discounted seats only when a New Entrant is offering a competing flight (Standard & Poor's, 1998). However, none of the bills were signed into law. GAO was asked about proposed legislation that would force divestiture of airport facilities by Incumbents and Director Jay Etta Z. Hecker, Director of Physical Infrastructure Issues of the GAO expressed concern that the proposed legislation may have adverse unintended consequences:

Forced divestiture of airport facilities would [not] necessarily result in real price competition in high value markets because the new competition may

or may not have a cost advantage relative to the dominant airline ... [and] could result in the reduction of service to smaller communities (Senate Committee *Aviation competition: Challenges in enhancing competition in dominated markets*, 2001, p. 3).

Director Hecker further indicated that New Entrants, many lacking capital, may be reluctant to enter markets or cut prices where an Incumbent has a large market share and could retaliate with fare cuts in other markets it shares with the Incumbent (Senate Committee *Aviation competition: Challenges in enhancing competition in dominated markets*, 2001) (see “trashing and bombing” in Chapter 6). Congress did pass the Wendell H. Ford Aviation Investment and Reform Act in 2000, which requires some large and medium-size airports to submit annual plans on New Entrant access as part of the airport grant and PFC process (Senate Committee *Aviation competition: Challenges in enhancing competition in dominated markets*, 2001).

Airport Conclusions by the FAA and GAO

The FAA/OST (1999a) task force concluded that the Hub and Spoke allowed airlines to:

... serve the maximum number of ... markets with a minimum number of airplanes ... maximizing traffic flow ... [T]ravelers at hub cities [have] many more flights and enables airlines to offer more service in markets without enough traffic to sustain non-stop service ... [However,] the efficiency gains of hub operations make it more difficult for other air carriers to challenge the dominant carrier in local markets, thereby allowing it to charge high average fares in many local hub markets (US FAA/OST, 1999a, p. 1).

The GAO found the “... presence of a single carrier with a large market share does not always mean that average airfares will increase over time...” (US GAO, 1999a, p. 9). Specifically, GAO found that Delta, Northwest, and United,

who had more than 40% of the market in 18 out of 46 airports, average airfares declined between 20% and 29.9% from 1990 to 1998 (US GAO, 1999a). However, GAO also found that low airfares were unevenly distributed across the nation and high fares were more common at Concentrated Airports, including slot-controlled airports (US GAO, 1999a). The FAA/OST study found airport authorities' leasing and management practices "... effectively cede control over their airport facilities to the dominant carrier... [and is] especially evident in the administration of long term, exclusive use lease agreements at large commercial hub airports" (US FAA/OST, 1999a, p. 29) where Incumbents maximize control of their Hubs and profits.

The FAA/OST study reported that airport authorities seemed unaware of ways they could and are required by law to enforce New Entrants' entry on a proactive basis, as well as how to use PFCs to break MII veto powers and weaken Incumbents' bargaining powers in lease negotiations and day-to-day operations of the airport. The FAA/OST task force also found that the FAA was not assertive in emphasizing PFC requirements such as reviewing sublease agreements, non-exclusive use of PFC projects, and assisting New Entrants. In fact, based on data from the Airport Council International survey, most new terminal facilities that used PFCs were built for Incumbents (US FAA/OST, 1999a). There was a wide divergence in airport practices for accommodating New Entrants as shown in the differences in airport practices.

There has been a notable change in the bond industry, which now appears to rely more on the economic fundamentals of a capital project, including the strength of the local economy and the traffic base, and less on the long-term agreement with the Incumbent at the airport. These changes were instituted after numerous airline bankruptcies (US FAA/OST, 1999a). However, bond markets now require airlines to approve PFC-backed capital projects in case airport authorities are unable to provide sufficient revenues to cover PFC bonds. This would allow bond authorities to seek repayment of PFC bonds under an airline's Residual Lease.

The GAO (1996) did recognize Incumbents' substantial investments in airports and in developing their services. Northwest's Senior Vice President of corporate affairs stressed to GAO (1996) that without Incumbents' investments, many airport expansion project that benefit New Entrants and Incumbents would not be possible. Northwest's executive and other airlines told GAO that long-term, exclusive use gate leases were a key element in financing airport expansion projects. The CEO and President of American stressed that they were building upon their grandfathered slots and invested hundreds of millions of dollars in buying additional slots and developing and expanding the airports. It is critical that it be clearly understood who pays for airport infrastructure. The fact that Incumbents carry these costs is a troubling public policy issue. If all our Incumbents are bankrupt, who will pay for airport infrastructure?

Conclusion

The airports themselves serve as a restriction on unlimited entry to all “fit, willing, and able” airlines. This condition existed before Deregulation and continues today, with restrictions increasing as congestion and flight delays mount. However, it is not just the physical limitations of airports, sufficient real estate, long runways, or environmental conditions, that constrain entry, but long-standing practices and procedures of airport authorities, airlines, and bond markets that limit competitive entry. How airport capital projects are funded shows how these three stakeholders encourage or inhibit airport expansion to accommodate New Entrants.

The role of the government has been described as it attempted to increase New Entrants in key airports but governments’ efforts have been ineffectual because of the basic problem of a lack of airports to keep up with demand for airports. This basic problem can be laid primarily to a lack of funding to pay for airports and, as will be discussed in later Chapters, the infrastructure for the national airspace (e.g., radar, NextGen, and safety equipment). As shown in Figure 35, airports regardless of size rely on federal grants, which often require matching funds from states, cities, and municipalities. Federal airport funding, as shown in Table 29, has failed to keep up with the needs of the airports, particularly when construction inflation is taken into account. GARBs, supported by financially fragile Incumbents, are still the primary source of airport funds. It is no wonder that airport supply and demand is out of balance.

The next chapter will discuss in detail government efforts to open slot-controlled airports to New Entrants as well as other government antitrust actions to counter Incumbents' use of Hub and Spokes to achieve above industry rents.

CHAPTER 9

ANTITRUST ACTIONS AND THE HUB AND SPOKE

As Incumbents try to maintain and expand their Hubs and therefore continue to produce above industry rents, New Entrants and the government are trying to break into Hubs. Thus, antitrust actions and legal challenges, one of the primary ways that the government has of controlling the industry, form an ongoing crisis for all three parties, Incumbents, New Entrants, and the government. Ongoing government efforts to eliminate Incumbents' control of hubs have been unsuccessful for a variety of reasons and slot-controlled airports continue to this day to charge the highest fares in the industry to consumers and continue to be a defensible competitive position for Incumbents. Other airlines, recognizing the value of these competitive strategies at slot-controlled hubs, have quickly moved to other airports to replicate hubs and the cycle of crisis continues. The government, in the interest of price competition and consumer welfare, has on-going antitrust concerns as Incumbents increasingly dominate Concentrated Airports (including slot-controlled airports). The various government agencies, the DOJ, DOT, FAA, GAO, and Congress have exerted significant resources on efforts to increase New Entrants at Concentrated Airports. Three efforts will be discussed in this chapter:

1. Slot- and perimeter-controlled airports;
2. antitrust actions; and
3. the FAA's Airport Compliance Requirements (Order 5190).

Slot-Controlled Airports and the High Density Rule of 1969

Five airports, La Guardia, JFK, National, Newark, and O'Hare, were so congested that entry and exit were limited under the High Density Rule of 1969. This rule created "slots" — a limited number of assigned take offs and landings. Each airline was given a specific landing or takeoff slot, and without a slot an airline could not operate at that airport. Newark Airport was removed from slot controls in 1970, but was recently proposed to be reinstated with some sort of controls in 2008 by the FAA (Wald & Belson, 2007). Slot-controlled airports are located in densely populated areas — the New York – New Jersey area, Washington, D.C., and Chicago. Some slot-controlled airports are also perimeter-controlled, which limits the distance an airplane can fly. That is to say, an airplane can only fly 1,250 miles to and from National Airport and 1,500 miles to and from La Guardia Airport. Perimeter-controlled airports were discussed in Chapter 7 and will be addressed later in this chapter. All the slot-controlled airports are also Concentrated Airports, with high demand for New Entrant access. As previously discussed in Chapter 6, Incumbents managed slots through slot scheduling committees. During regulated times small adjustments were made for schedule changes, but slot scheduling committees were unprepared for the onslaught of demands for entry after Deregulation and were unable to function.

After years of litigation and discussion the FAA amended the High Density Rules in December 1985:

1. Slot scheduling committees, which had antitrust exemptions, were eliminated. These committees were made up of Incumbents that coordinated schedules and swapped slots to accommodate traffic. There was no incentive for Incumbents to award New Entrants highly valued slots.
2. Slots were allocated to Incumbents that were the holders of record as of December 16, 1985 and became grandfathered rights.
3. After April 1986, airlines were allowed to sell or lease slots subject to FAA approval.
4. Incumbents had a "use or lose" provision that required slots to be used 65% of the time or be subject to forfeiture to the FAA.
5. Each Incumbent gave up 5% of their existing slots that were entered into a lottery for New Entrants, creating a pool of 152 slots. Any new, returned, forfeited, or unallocated slots that became available were added to future lotteries (US GAO, 1990b).

The 1985 High Density Rule changes had the unintended consequence of allowing eight Incumbents to increase control of slots from 70% to 96% in just three years (US GAO, 1990b). Incumbents increased their market shares by leasing or selling slots to related airlines, those that were part of the same corporate entity, a merger partner, a purchased airline, or code-sharing alliance partner. Leasing was considered "using a slot" and not subject to forfeiture. An airline with eight slots or less was exempt from forfeiture. This latter exemption

led Incumbents to sell or lease eight slots to related airlines. Slot sales between related airlines increased substantially by quarterly average: 14% in 1986, 32% in 1987, and 40% in 1988 (US GAO, 1990b). Slot leases between related airlines also saw the same increase by quarterly average of 14% in 1986, 24% in 1987, and 20% in 1988 (US GAO, 1990b). In 1989, in response to Incumbents selling and leasing slots to related airlines, the FAA issued a new rule that protects an airline with eight or fewer slots only if the slots are used by the airline for its own operations and not leased to another airline. Based on the data presented in Appendix H this new rule appeared to have no effect on Incumbents' control of slots.

Additionally, Incumbents strictly control sublease terms for New Entrants at slot-controlled airports to the point that they are increasingly using shorter sublease terms as shown in Table 30. Very few New Entrants can justify major

Table 30
Sublease Terms for Slot-Controlled Airports: 1986 – 1996

Lease Term	1986	1987	1988	1989	1996
Less than 30 days					10%
60 days or less	52%	78%	66%	70%	
90 days or less				50%	12%
180 days		3%	9%	33%	

Note: The data from *Airline Competition: Industry Operating and Marketing Practices Limit Market Entry*, by US GAO, 1990, Washington, DC: US GPO, p. 28 and *Airline Deregulation: Barriers to Entry*, by US GAO, 1999, Washington, DC: US GPO, p. 6.

capital investments if access to an airport can be terminated on such short notice (US GAO, 1990b, 1996). In addition to slots, other airport real estate is required to run an operation such as difficult to obtain gates, waiting areas, baggage areas, and ticket counters. If a New Entrant becomes a competitive threat, the sublease can be easily cancelled, often on two to thirty days notice, and with little chance of finding alternative space (US GAO, 1990a). Few Incumbents subleased to nationals, whose lower cost structure made them significant competitive threats (US GAO, 1990b).

As Incumbents received grandfathered slot allocations from the FAA in 1985, they enjoyed a significant cost advantage. Incumbents pay airport authorities rent, as negotiated in their long-term leases. New Entrants pay Incumbents to sublease slots as well as other airport space at a significant mark up. Southwest officials told GAO (1990b) that they pay other airlines about twelve to eighteen times as much as the Incumbent pays the airport authority for leased space. Because Incumbents tie ground service with subleases, New Entrants face multiple excessive costs. Southwest reported that the use of another airline's employees in a typical handling agreement is about six times as much as the airline's own cost using its own employees. Another airline reported that it was asked to pay 25% to 50% more than the market rate for ground services at O'Hare Airport (US GAO, 1990b). America West wanted to start service at Denver Airport but was asked to pay three times the actual costs for another airline to handle its flights (US GAO, 1990b).

GAO concluded that New Entrants had no opportunity to obtain sufficient slots to challenge Incumbents and nationals now had control of fewer slots since the rule change. A New Entrant could theoretically obtain slots through the FAA lottery or purchase or lease a slot from an Incumbent. However, very few slots were returned to the FAA and if they were, they were for undesirable periods such as early morning, late evening, or weekends. Of the original 152 slots returned by Incumbents, most lottery winners sold them, since slots sold for a premium of \$200,000 or more, and 36 slots were returned to the FAA because New Entrants were unable to use the slots within the proscribed time limits (US GAO, 1990b). Since 1986, GAO found that the sales of slots declined and leasing increased, "indicating that these airlines hold more slots than they need and lease out their excess slots rather than give up control of them to potential competitors" (US GAO, 1990b, p. 27). GAO concluded "Not a single new passenger carrier was able to establish service at a slot-controlled airport via purchasing slots" (US GAO, 1990a, p. 26).

Congress granted DOT authority to remove artificial slot controls or raise them to the highest practical levels, consistent with safety, in the Reauthorization Act of 1994, except at National Airport, while also recognizing community issues over congestion, noise, and safety issues (US GAO, 1999a). The criteria for slot awards under this act were:

1. Favor proposals that use jet aircraft that meet Stage III noise requirements;

2. proposed service would be operationally and financially viable; and
3. a premium given to proposals that provide new nonstop and competitive services, especially low-fare competition (US DOT, 1998).

To this end, 62 slots were added at O'Hare, 30 at La Guardia, and 6 at JFK Airports; American and United were asked to give up slots at O'Hare Airport in 2003; and JFK Airport was partially removed from slot controls in 2007 (Belson, 2007). Of the slots granted at La Guardia and O'Hare Airports by DOT in 1998 to six airlines (America West, Atlantic Coast Airlines, Simmons Airlines, Trans States Airlines, ATA, and Spirit) three went bankrupt or had been in bankruptcy (America West, Atlantic Coast Airlines, and ATA) and Simmons Airlines was part of American Eagle, a subsidiary of American. The slots were granted for specific routes, such as America West for service from O'Hare Airport to Phoenix Airport. However, most of the slot awards were for routes to relatively smaller communities such as Charleston, WV, Springfield, MO, Wilkes-Barre, PA, Chattanooga, TN, Roanoke, VA, and Tri-Cities, TN (US DOT, 1998). Forty-eight slots were given exemptions to provide small communities minimum levels of access to slot-controlled airports under the subsidized EASP (US GAO, 1999a). Exacerbating the slot problem was the high cost of purchasing a slot, if available. FAA officials and airlines told GAO (1996) that prices rose significantly in the last decade to one-half million dollars for an off-peak slot to more than two million dollars for a peak-period slot.

However, GAO found that DOT, in its administrative powers to award slots, had "... concluded that eliminating the slots would not be in the public interest because the project benefits to consumers would be outweighed by the negative impacts on the incumbent airlines in terms of flight delays and reduced profits..." at JFK, La Guardia, and O'Hare Airports (US GAO, 1996, p. 8). DOT interpreted the "exceptional circumstance" criteria narrowly and rejected applications in those markets already receiving nonstop service (US GAO, 1996). DOT rejected two of four applications, those from Western Pacific and Spirit Airlines, despite the competitive benefits for consumers by allowing a New Entrant's challenge of an Incumbent's monopoly (US GAO, 1996). DOT, in denying Spirit Airline's application (Order Denying Request for Exemption, Application of Spirit Airlines, Inc., DOT (OST-95-265, August 25, 1995)), said, "... it is clear from the legislative background that the lack of nonstop service in larger markets was clearly on the minds of several supporters with regard to the exemption provisions" (US GAO, 1996, p. 9). GAO disagreed with DOT's interpretation saying, "In our review of the legislative history ... we found no congressional guidance on the interpretation of the exception circumstance criterion" (US GAO, 1996, p. 9). With such a narrow interpretation, DOT discouraged New Entrants, and potential New Entrants told GAO that they would "not waste the time" applying for slots in markets where an Incumbent already provided nonstop service. Incumbents, therefore, aided by DOT, were able to thwart New Entrants by providing nonstop service to various cities. Thus, Spirit

Airlines was refused a route in 1995 between Detroit Airport and La Guardia Airport because Northwest already provided nonstop service.

A review of each of the slot-controlled airports shows the impact of the 1985 High Density Rule change and the inability of New Entrants to enter these airports and is summarized in Appendix H. While Appendix H covers most of the Incumbents' battles for slots, it is noteworthy that these slot battles continue today, with the reinstatement of slot-controls at JFK and Newark Airports, of which the latter was decertified as a slot-controlled airport in 1970. As part of the Reauthorization Act of 1994, Congress directed DOT to create exemptions to slot controls to increase competition. The FAA eliminated slot controls at JFK Airport between 3:00 – 8:00 pm, resulting in:

... airlines rushed to offer new flights, quickly clogging the airspace, runways, taxiways and gates at Kennedy. In many cases, smaller regional jets that seat only up to 70 passengers account for many of the new flights, yet the demands they place on air traffic controllers are similar to those of larger jets (Belson, 2007, p. A21).

Delta, with a major hub at JFK Airport and a post-bankruptcy strategy emphasizing more profitable international flights, has about 61% of its departures to 86 cities on smaller regional jets. "There are a lot of markets where the distances aren't that great, and for fuel and scheduling purposes, it makes more sense to use smaller planes," said Sametta C. Barnett, Director of government affairs at Delta. Ms. Barnett continued, "You have to have domestic feeds to get people from across the 50 states to the international flights" (Belson, 2007, p. A21).

Delays of one to two hours are increasingly common at JFK and Newark Airports (Belson, 2007). Because airlines fly hub to hub, flight delays at impacted airports affect flights at other airports as the day progresses, eventually affecting not only the domestic airspace system but international flights to Europe and the Middle East. "The delays are wreaking havoc ... folks are missing connections at our hubs in Germany," said Jennifer Urbaniak, a spokeswoman for Lufthansa (Belson, 2007, p. A21). Simultaneously, at La Guardia Airport where slot controls and perimeter limits are still in place, flights decreased 1% for the first four months of 2007, compared to an increase of 26.4% at JFK Airport and 6.9% at Newark Airport (Belson, 2007). DOT reclassified JFK and Newark Airports as being sufficiently congested to require airlines to provide their schedule information five months in advance (Wald, 2007b). From October 2006 to July 2007 arrival delays increased 114% and arrivals within 15 minutes of the scheduled time dropped to 61.2% from 69.7% at JFK Airport, with similar numbers for Newark Airport (Wald, 2007b).

As with scheduling committee problems at National Airport in 1980, airlines cannot agree on how to cut traffic and cannot broach the topic without antitrust immunity. Some government officials have suggested that airlines use large airplanes and fly less frequently. However, this solution would decrease airplane loads and utilization which would in turn increase airlines' costs. Further, small and medium-size communities are concerned as they do not generate enough traffic to fill large airplanes. Such a mandate may leave them without

service or with only curtailed service such as having their non-stop flights changed to flights through another hub with one or two stops (Wald, 2007b).

Dick Marchi, a senior adviser to the Airport Council International, a trade association, said the decision to reclassify JFK and Newark Airports as sufficiently congested could subject international flights, which now have priority, to limits. According to Mr. Marchi, "... it almost sounds like JetBlue [with a hub at JFK Airport] and Continental [with a hub at Newark Airport] have figured out that two possible solutions is to get the status [changed to sufficiently congested] ... so they'll get some constraints on international traffic" (Wald, 2007b, p. C4). Mr. Machi said his association favored giving airports more authority so they could use fees to promote more realistic schedules and he expected the government to take some action (Wald, 2007b).

Port Authority of NY and NJ (PATH), seeking a solution to bottlenecks at its three airports and expecting an additional 25 million passengers by 2015, set up a task force of airline executives, regulators, and other officials (Belson, 2007). However, PATH has no jurisdiction over airlines and is, in fact, prohibited from discriminating against certain sized airplanes (see Appendix C).

Robert C. Land, JetBlue's Senior Vice President for government affairs, asked the FAA to reimpose traffic limits at JFK Airport if delays cannot be reduced, stating, "The FAA has a responsibility that demand at the airport does not outstrip capacity" (Belson, 2007, p. A21). The FAA's long-term solution is new technology that will allow planes to fly more efficiently, the addition of

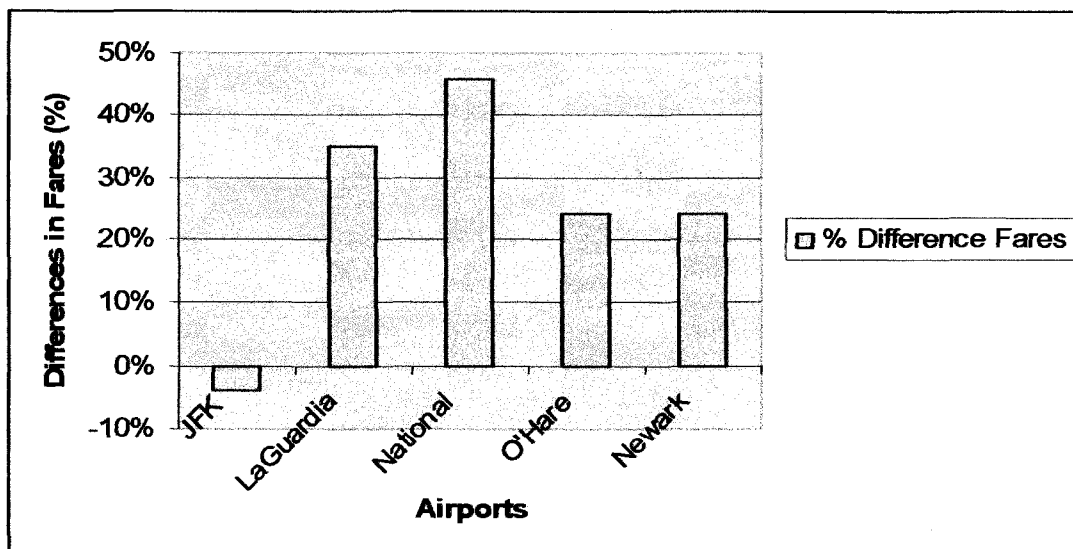
another satellite that will allow planes to fly closer together in bad weather, and redesigned airspace to redirect the flow of traffic more efficiently according to Mike Cirillo, FAA Vice President of system operation services (Belson, 2007). The government is considering congestion pricing for landing fees with higher fees at busier periods, which airlines oppose. One government official who was involved in discussions with President G. W. Bush, the Secretary of Transportation, and the acting head of the FAA said, "It's very clear the direction they are heading, toward some sort of federalized increasing level of control" (Wald, 2007b, p. C4). Indeed, the FAA has proposed a plan to restore slot controls at JFK and Newark Airports (Wald & Belson, 2007), controlling all three New York – New Jersey airports and auctioning slots (Wald, 2008d).

JFK Airport authorities lease 99 gates under exclusive use and 14 under preferential share use with the largest block of gates leased until 2015 (see Appendix G). PATH, according to the FAA/OST (1999a, p. 43) task force, allows "... dominant carriers to control capital development at the airport" and does not limit sublease charges for New Entrants.

Hub Premiums at Slot-Controlled Airports

A review of hub premiums at slot-controlled airports in Figures 36 and 37 show that slot controls provide above industry rents to Incumbents. The GAO (1996) compared slot-controlled airports to 33 other large hubs in 1995 and found large hub premiums at all slot-controlled airports except JFK Airport.

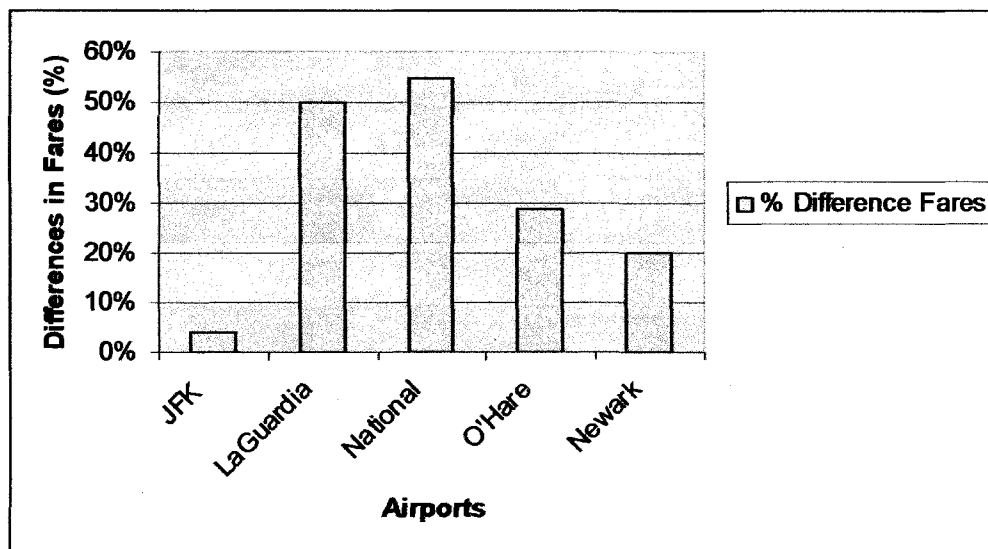
Figure 36
Percentage Difference in Fares at Slot-Controlled Airports v. 33 Other Large Hubs: 1995



*Note: The data from *Airline Deregulation: Barriers to Entry Continue to Limit Competition in Several Key Domestic Markets*, by US GAO, 1996, Washington, DC: US GPO, Figure 2, p. 21.*

Matching the increased consolidation of slots among Incumbents the GAO (1999a) found hub premiums increased in 1998 at all slot- controlled airports except Newark Airport. The 1996 GAO study used 33 other large hubs as the comparison group while the 1999 GAO study used other airports of similar size communities as the comparison group. Borenstein's (Oster & Strong, 2001) data on hub premiums at O'Hare Airport is yet another data set and shows a 15% hub premium at O'Hare Airport, as shown in Appendix H, compared to 24% as shown in Figure 36. While the comparison groups are different for the data sets the overall trend of increased hub premiums

Figure 37
Percentage Difference in Fares at Slot-Controlled v. Other Airports
of Similar Size Communities: 1998



Note: Differences in average fares (in cents) per passenger mile for constrained airports relative to fares at other airports serving communities of comparable size. The data from *Airline Deregulation: Changes in Airfares, Service Quality, and Barriers to Entry*, by US GAO, 1999, Washington, DC: US GPO, Table 4, p. 21.

match increased slot control by Incumbents.

Specifically, National Airport Incumbents had the highest hub premiums of 45% in 1995 and 55% in 1998. La Guardia Airport Incumbents enjoyed the second largest hub premiums in 1995 and 1998 of 35% and 50%, respectively. Appendix H correspondingly shows the increased dominance of slot control by American, Delta, and US Airways from 1986 to 1999. American and United maintained their slot dominance at O'Hare Airport (see Appendix H) and their hub premiums. JFK Airport achieved one of the smallest fare differentials over

comparison airports in 1998 of 4%, though up from a negative 4% in 1995. In 1995 the GAO classified Newark Airport as a Concentrated Airport, with percentage fare differences of 24% in 1995 and 20% in 1998 over two comparison groups (US GAO, 1996, 1999a). With increased regulatory control of slots at JFK and Newark Airports hub premiums are expected to rise.

Perimeter-Controlled Airports

FAA Advisory Circular 5190.6A, ¶4-8d, allows airport authorities that own multi-airport systems to designate certain airports for use by a particular class of airplanes, but must accommodate all airplanes classes within the system without unreasonable penalties to any class, such that the designation is beneficial to the overall system capacity (US FAA/OST, 1999a). "The perimeter rules were originally designed to promote Kennedy [JFK Airport] and Dulles as the designated long-haul airports ... and to alleviate air traffic congestion in those areas" (US GAO, 1999a, pp. 19-20), with La Guardia and National Airports the designated respective short-haul airports. JFK and Dulles Airports were new airports with longer runways built to accommodate large-body airplanes and international travel.

Flight distances are limited to 1,500 miles for La Guardia Airport and 1,250 miles for National Airport. While the La Guardia Airport limitation is an airport authority decision, Congress chose to permanently establish the National Airport perimeter at 1,250 miles and to limit the number of flights to and from the airport (Metropolitan Washington Airports Act "The metropolitan washington airports act

of 1986," 1986b). Congress continued this pattern by not including National Airport when it requested DOT to allow additional slots at JFK, La Guardia, and O'Hare Airports (Federal Aviation Reauthorization Act (1994)). Perimeter rules exacerbate competitor entry problems. American, Delta, and US Airways, all Incumbents, had their hubs within perimeter limits while the hubs of America West and Southwest, both New Entrants, were not. This problem was partially solved when America West merged with US Airways in 2006.

The Metropolitan Washington Airports Authority CEO and General Manager told GAO (US GAO, 1996) of his concern that eliminating perimeter rules would let Incumbents shift from short-distance routes in the Northeast to more profitable long-distance routes, eliminating his perceived market. GAO concluded, "... Congress may ... wish to grant the Secretary of Transportation the authority to allow exemptions to the perimeter rule at National Airport" (US GAO, 1996, p. 23) to improve competitiveness. GAO also concluded that the perimeter rules designed to promote JFK Airport and Dulles Airport as long-distance airports has "... limit[ed] entry and exacerbate[d] the impact of slots" (US GAO, 1996, p. 23). A third airport, Love Field Airport in Dallas, is perimeter-controlled to nearby Texan states and/or by size of airplane. Because this airport is the headquarters and hub of Southwest, it is covered in Chapter 7.

The role of slot- and perimeter-controlled airports and the government's efforts to increase competitor entry has been reviewed. The government's efforts to increase competition at these airports via the 1985 change to the High Density

Rules had the unintended consequences of Incumbents increasing their slots. The original goal of slot-controls was to control airport and airspace congestion. Government efforts to increase New Entrants at slot-controlled airports via the Reauthorization Act of 1994 have only exacerbated congestion problems, forcing the government to reinstate slot controls as delays threaten not only the national airspace but those internationally as well. Slot controls do provide Incumbents with above industry rents because of high demand for flights at these airports, located in densely populated areas of the US.

Antitrust Actions

Prior to Deregulation, CAB provided "service" competition by granting route awards to two or more airlines. By regulating entry and price, CAB ensured that each airport did not have excessive competition, so that each airline could earn a "profit." CAB was also responsible for ensuring that all communities, including small and isolated ones, received regularly scheduled air service, and cross-subsidized those unprofitable routes with profits from more lucrative routes in densely populated cities. This CAB balancing act led to a limited number of Incumbents at each airport at the time of Deregulation.

As shown in Chapter 6, Incumbents quickly began to consolidate their control over key airports with the Hub and Spoke system using leases, standard operating airport and bond practices, mutual self interest with airport authorities, and existing limitations to the already congested airports to block competitive entry. Incumbents also took advantage of feeder airlines, alliances, mergers,

bankruptcies, and code sharing to increase their control of airports and obtain above industry rents. One of the expectations of Deregulation was that unlimited competitive entry would allow many airlines to operate at each key airport and the market place would determine fare prices. However, because of the usage of the Hub and Spoke as a radical innovation, and the existing limitations of airports, the number of Incumbents continued its decline from sixteen in 1938 to ten airlines (US GAO, 1990a) and airport domination by one or two Incumbents increased. In response, the government and competitors have undertaken a number of antitrust actions against some Incumbents using the tools described below.

Antitrust Background

Why is antitrust a crisis for business? There are a couple of reasons. First, whenever federal regulators investigate a business it is a crisis for those who are investigated. It means that valuable time, resources, and management attention must be spent to ensure that regulators and competitors don't find any anticompetitive behavior, as defined by law. Some Incumbents, like United, tried to remain under the regulators' radar by minimizing above industry rent opportunities at its Denver hub and disposing of 50% of its CRS. Other Incumbents, such as American, attracted the regulatory spotlight by vigorously defending itself at Congressional hearings and aggressive competitive strategies against New Entrants. Second, the antitrust actions of regulators can force airlines to divest valuable parts of the business. Regulators can impose fines,

bring criminal charges including jail time, and/or deny approval of a merger or acquisition.

Organizations manage this antitrust crisis in several ways by:

1. Seeking approval of actions in advance, either through a trial balloon or proposal, such as United proposed merger with US Airways in 2000;
2. giving political donations, such as American's contributions to presidential campaigns;
3. hiring lobbyists and political action committees;
4. structuring any proposal in ways that will improve the odds of regulatory approval;
5. carefully selecting the department that will be most likely to approve mergers and presenting them in the appropriate jurisdiction such as DOT instead of DOJ or CAB or before an administration change in Washington;
6. conducting business so as not to attract regulatory attention;
7. developing a collaborative manner with regulators as Southwest did with the FAA airplane inspectors;
8. building sympathy with regulators (i.e., DOT and slot-controlled airports);
9. aiding Congressional investigators, such as Southwest and smaller airlines did against air traffic control fees; and
10. merging with financially troubled airlines as American and TWA did.

Whenever two financially healthy airlines propose a merger or alliance, CAB, DOJ, and/or DOT must define which markets are relevant, determine if the merger or alliance creates too much market power for the proposed company, and decide if the merger or alliance will prevent competitive entry. As an oligopoly, as the airline industry is often described, there is greater antitrust concern on the part of federal regulators than if the industry is composed of thousands of suppliers, such as coffee shops. DOJ has a number of antitrust tools at its disposal to fight anti-competitive behavior. The first of those tools is Sections 1 and 2 of Sherman Act of 1890. The Sherman Act is particularly germane to the airline industry in dealing with antitrust issues, the possibilities of monopolies, and predation in the marketplace. The second tool that is critical for the DOJ is the process of defining a market. A narrow view of markets, such as simply city-pair routes between, for example, New York City and Los Angeles, is different than a broad view of a market, for example, the Western US as an entire market. In the first case, a regulator can make the case to approve a merger of airlines if there is sufficient competition in the New York City–Los Angeles market. However in the second case, the same regulator may not approve a merger if both airlines dominate many markets across the West, as was the case in the unsuccessful merger attempts of Continental and Western. The third tool is the limitation of predatory behavior in the marketplace. This tool is used by regulators and competitors to raise antitrust concerns if a firm exhibits predatory behavior in the marketplace. Armed with these tools, regulators can bring

antitrust actions through the court system, by their approval or denial of proposed mergers and alliances, and by use of a close regulatory spotlight.

Sherman Act, Sections 1 and 2

The Sherman Act, Sections 1 and 2, form the basis for antitrust actions in the airline industry. It addresses several components of monopolistic action that are relevant to airlines. A list of regulations and court rulings is listed in Appendix C. The following will be discussed below: tying, Essential Facilities Doctrine and Majority-In-Interest (MII) Leases, and Passenger Facility Charges (PFC).

Tying

Section 1 of the Sherman Act prohibits “tying” of one activity predicated on another activity. Tying occurs when the seller has sufficient economic power in the market to enable it to restrain trade in the market for the tied product and a not insubstantial amount of commerce in the tied product or service is affected (US FAA/OST, 1999a). For example, if an Incumbent subleases space to a New Entrant and requires the purchase of ground services as a condition of the sublease, the sublease is “tied” to the purchase of ground services. This is illegal under the Sherman Act. New Entrants testified to the GAO (1996) that they strongly prefer not to sublease gates because the Incumbent lessor typically insists that the sublessees use the Incumbent’s ground personnel, which artificially raises costs, sometimes by six times. Further this tying may reduce efficiency and cause labor friction as the Incumbent’s staff may be personnel

from a rival union or the New Entrant's staff may be non-union employees. The FAA/OST (1999a) task force reported on numerous cases of reluctance of Incumbents to accommodate New Entrants as well as tying of ground services with subleases for airport space.

Essential Facilities Doctrine and Majority-In-Interest (MII) Clause

Another application of Section 1 relates to MII clauses. An "unreasonable exercise of MII power by two or more airlines to block a capital project for a competitor ... if [the] airport would be unable to satisfy the demand for facilities and if MII carriers had no legitimate justification for their action" (US FAA/OST, 1999a, p. 28) is a violation of the Sherman Act.

Section 2 of the Sherman Act covers the Essential Facilities Doctrine (US FAA/OST, 1999a). An essential facility is a facility that a company must use to access customers. In the ground breaking MCI Communication v. American Telephone and Telegraph Co. case (AT&T) (708 F 2d 1081, 1132-33 (7th Cir) (1983)), the jury ruled that AT&T must allow a competitor access to its facilities, for without access, the competitor could not access customers. Similarly, because airports control entry and exit onto the national airspace, airports are essential facilities, and must be made accessible to competitors who wish to provide services to passengers. The Essential Facilities Doctrine standard requires facilities to meet four tests in order to be deemed essential facilities:

1. Control of essential facility is by a monopolist;

2. competitor's inability practically or reasonably to duplicate the essential facility;
3. denial of use of the facility to a competitor; and
4. feasibility of providing the facility.

In another case, the *Delaware and Hudson Ry v. Consolidated Rail Corp.* 902 F. 2d 174, 179-180 (2nd Cir 1990), a long-haul railway company violated the Sherman Act when it denied a competing railway company access on reasonable terms to its short-haul tracks. The federal courts affirmed the Essential Facilities Doctrine and added reasonable economic terms in its findings. This case establishes that the Essential Facilities Doctrine applies transportation, not just communications. Airports qualify as essential facilities under this doctrine because:

1. Incumbents at Concentrated Airports act as monopolists;
2. a New Entrant cannot practically or reasonably duplicate the airport;
3. airport authorities can deny New Entrants access because of lack of space and Incumbents can refuse access; and
4. it is feasible for airport authorities and Incumbents to make accommodations for New Entrants to share space.

As airports qualify as essential facilities, airport authorities must make reasonable efforts to accommodate New Entrants, free of economic discrimination. Since Signatory Lessee status provides economic benefits such

as lower fees, airport authorities must allow airlines that are willing to assume signatory status to achieve it, especially if the ability to meet such status is hindered by airport policy or lack of space at the airport. Because airline usage at the airport varies, airports may charge different rates to reasonable classifications between a lessee, a sublessee, a Signatory Lessee, and a non-Signatory Lessee.

Despite the Essential Facilities Doctrine that should govern airport facilities, airport authorities maintain that they are unable to meet the legal requirements because they are too crowded and unable to expand to meet the New Entrants' needs. Thirty-one percent of the surveyed large and medium airport authorities reported to GAO (1990a) that they had no unused ticket counter space. Sixty-two percent reported they had no unused passenger waiting areas and 67% had no unused baggage and passenger waiting areas. Airport authorities reported to the GAO (1990b) that several major constraints cause New Entrants' needs to be unmet: community opposition to noise and traffic; existing runways are too short for some airplanes; environmental constraints due to wetlands and water drainage; funding restraints; lease restraints, including MII and exclusive use clauses; government requirements and regulations; and a limited air traffic control system to handle expansions.

The Residual Lease, which grants Signatory Lessee status, lower fees, long lease periods, preferential or exclusive use space, and MII veto rights, is probably one of the most difficult elements constraining New Entrants at key

airports and is fully discussed in Chapter 8. Leases are meant to protect both the lessee (airline, whether Incumbent or New Entrant) and the lessor (airport authority). It provides the airport authority with a long-term credit-worthy lessee to ensure that their airport space is rented out and will generate a minimum amount of rent to cover operating and capital costs. It ensures that the airport authority will have a lessee who will provide commercial airline services to their community. Because most airport leases contain MII clauses (see Chapter 8), Incumbents can veto projects that are not in their interest, which, unsurprisingly, includes paying for expansion space to accommodate New Entrants.

Under the Essential Facilities Doctrine, airport authorities must make space available to New Entrants, and if none is available, must encourage Incumbents to accommodate them. Incumbents do not easily cooperate with New Entrants who represent a significant competitive threat to their revenue stream and hub premiums. Tying has already been discussed as a way to discourage New Entrants who sublease space from Incumbents. MII veto power is another way to prevent airport expansion, especially if several Incumbents act in concert to veto a project. Short-term subleases were shown in Table 30, with options to cancel subleases if the New Entrant became a competitive threat. Foot dragging and delays were typical responses by both Incumbents and airport authorities as well as a lack of understanding by airport authorities of their obligations to aid New Entrants in acquiring airport space (see Appendix C).

Passenger Facility Charge (PFC)

The government, in response to Incumbents' MII veto power and airport authorities' lack of funds at a time of declining federal funds, created the PFC to pay for airport expansions. The PFC provides airport authorities with an alternative funding source to expand airports and accommodate New Entrants. However, as the GAO (1990c) stated, independent funding was not the only constraint on airport expansion and competitive entry. Congress and the GAO, concerned that higher fares reflected growing Incumbent market power, not cost differences, said,

We do not believe ...that airline deregulation has failed. ... Competition must be strengthened and ... barriers ... reduced. Thus the issue before Congress should not be whether the airline industry needs to be reregulated but rather what steps can be taken to revitalize competition in markets where competition has been reduced (US GAO, 1990a, pp. 75-76).

In response, Congress modified the Airport Development Acceleration Act of 1973 to allow passengers to be charged a PFC to fund airport improvements (see Omnibus Budget Reconciliation Act of 1990 in Appendix C). PFCs can be used to preserve or enhance safety, capacity, or security of air transport systems; reduce or mitigate noise impacts of airports; and furnish opportunity for enhanced competition between airlines, such as common-use airport terminal facilities (e.g., baggage claim delivery, automated handling equipment, holding areas, and loading bridges at large and medium-size hubs). Not originally eligible for PFC funding were ticket counter and gates, including passenger check-in areas, because they were considered revenue generating facilities. Further,

discretionary PFC grants were not allowed for terminal improvements at large and medium-size hubs (US FAA/OST, 1999a). Congress later expanded PFC projects to include gates, passenger movement areas, infrastructure, and debt service (US FAA/OST, 1999a).

In testimony before the House Aviation Committee on Public Works and Transportation, Kenneth M. Mead, Director, Transportation Issues Resources, Community, and Economic Development Division of GAO explained PFC's purpose:

PFCs could help shift more control over airport expansion decisions from airlines back to airports by reducing airports' need for airline approval of capital projects. A PFC could be especially useful ... where one or two airlines control most of the traffic or most of the gates and other essential facilities through restrictive leases. PFC funds could ... fill the gap between airport capital needs and federal funding. However, a PFC would not be a panacea, because a lack of independent funding is not the only problem faced by airports trying to expand (US GAO, 1990c, pp. 1-2).

...Airports that are less reliant on airline financing could be better able to resist pressure to enter into long-term contracts with airlines containing exclusive use or MIIs (US GAO, 1990c, p. 5).

PFCs were permanently authorized by Congress and are not subject to Congressional re-appropriation as are Airport Improvement Program (AIP) funds.

Usage of PFCs is contingent on airport authorities aiding competitive entry:

1. Responding fully to any airline or public's assertion that a PFC project is anticompetitive (Omnibus Budget Reconciliation Act of 1990, Part 158, sec 25 (b)(7));
2. not allowing a contract between an airport authority and airline to block usage of a PFC (PFC (55) § 40117 (f)(1-3));

3. not entering into a lease of five years or more for space funded by a PFC. However, an airport authority may have a long-term, preferential use lease as long as it is not a *de facto* exclusive use lease. The lease cannot contain a carryover renewal provision that would automatically extend the lease term with an Incumbent in preference to a potential New Entrant.

Airport authorities may terminate an exclusive use lease or use agreement for existing space if the airline does not fully utilize the space or make it available to potential New Entrants (PFC (55) § 40117 (f)(2)); and

4. justifying in its PFC request any existing conditions that limit competition and listing initiatives it proposes to foster competition and expected results (PFC Part 158, section 15 (b)(7)).

The Airport and Airway Safety, Capacity, Noise Improvement, and Intermodal Transport Act of 1992 restricts DOT's authority on PFCs and allows PFCs to be used to convert military airports to civilian usage and reduce noise pollution.

Response to the PFC depends on perspective. George Doughty, Chairman of the Airports Council International, told the House Subcommittee on Investigations and Oversight, "These [PFC] funds are critical to the future of our airports and the national air transportation system" (McDowell, 1993, p. D3). However, some airports, including Atlanta, Cincinnati, Nashville, Raleigh, and Salt Lake Airports, hesitated imposing a PFC for fear of losing connecting

passenger traffic to hubs that don't impose such a tax, and putting their Incumbents at a competitive disadvantage (McDowell, 1993).

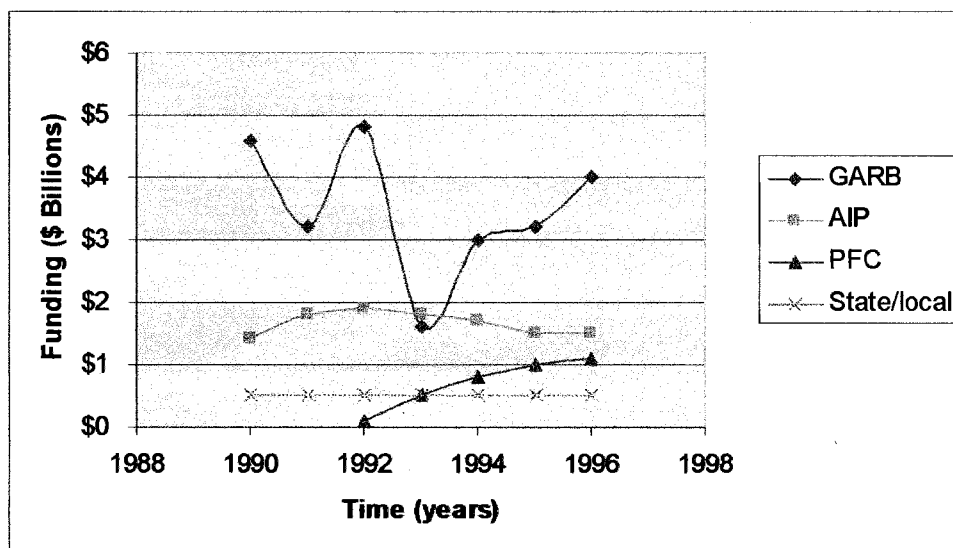
Airlines objected to the PFC because they perceived they would be at a competitive disadvantage, felt many of the proposed PFC projects were unnecessary, and/or feared that any increase in ticket prices scared away customers.

Northwest sued the FAA in the Court of Appeals and, rather than be competitively disadvantaged to other competitors that flew through airports without PFC charges, absorbed PFC cost of \$20 to \$25 million per year (McDowell, 1993). Northwest lost more than \$1 billion in 1992, narrowly averted bankruptcy, and could ill afford the PFC charges. Northwest asked the FAA to impose the tax only on passengers departing from or arriving at their final destination, not on those connecting to other flights (McDowell, 1993). "It still doesn't take care of the revenue drain," said Mark Abels, a Northwest Vice President. However, he added, "... at least in competing markets we would not be at a competitive disadvantage" (McDowell, 1993, p. D3).

As shown in Chapter 8 and Figure 38, PFCs are becoming an increasingly important source for airport capital improvements, matching AIPs. Equally important, however, are GARBs that often require Incumbents' approval and payment of debt service.

However, as with all rules, Incumbents and bond markets found a way

Figure 38
Sources of Airport Capital Funding: 1990 – 1996 (\$ billions)



Note: The data from "America's Future in Airport Infrastructure," by *Airport Business Practices and Their Impact on Airline Competition*, by FAA/OST and The American Association of Airport Executives, 1999, Washington, DC: US GPO, p. 4, Table 1.2.

to circumvent PFC's goals. Incumbents were often the beneficiaries of PFC projects (e.g., American benefited with a new international terminal at Miami International Airport (Miami Airport) constructed with PFC funds); Incumbents demanded that airport authorities give them veto rights over PFC projects for approval of MII projects; Incumbents and New Entrants sued over PFC projects; and the bond markets insisted on Incumbent approval of PFC projects in the event airport authorities failed to earn enough PFC revenues to cover debt service and would then seek repayment under Incumbents' Residual Leases.

Sherman Act: Predatory Behavior

The Sherman Act also addresses predatory behavior. The starting point for all antitrust actions is whether a company controls a significant part of the market. The definition of a “market” is therefore key. For example, does American control a large part of the Dallas market at Dallas Airport? American does control a large percentage of the Dallas Airport traffic. However, Southwest operates at nearby Love Field Airport, so the government felt that these adjacent airports moderated each other’s influence, and minimized any antitrust effects. In addition to specific airports, market definitions consider regions. For example, Delta dominates in the South with its hub at Atlanta Airport.

Definition of Market

A market is defined by DOJ as a minimal collection of firms that could sustain a price rise of stated size for a given period of time (Fisher, 1987). Market concentration is how much of a market a company controls. DOJ’s antitrust review considers the following elements:

1. Market concentration levels based on the fact that tacit collusion is more likely if concentration is high. If the market is concentrated how easy is competitive entry? If entry is difficult how likely is tacit collusion?
2. If despite high market concentration and possible tacit collusion, should the merger proceed because any efficiencies gained by the merger are likely to offset the losses from anticompetitive behavior (Fisher, 1987)?

CAB considered market concentration between individual city - pairs and the possibility of entry by other airlines. Both CAB and DOJ's evaluations considered entry barriers and the likelihood of New Entrant competition as well. In contrast, DOT, given responsibility for merger approval in 1985, used a very narrow definition of markets focusing on city – pair routes and increased efficiencies of the merged companies. In the opinion of Fisher (1987), who argued against the United - Pan Am Pacific transfer on behalf of Northwest, the DOT failed to take into account the larger picture of the airline industry, the ramifications of further mergers as a result of the approved purchase, Hub and Spoke barriers, and CRS innovations. Further this decision did not anticipate the future, or as DOT itself stated in its approval the "... result of any application by United in the Japan route case 'cannot be predicted here'" (Fisher, 1987, p. 507).

DOT's merger approval authority was moved to the DOJ on January 1, 1989 amid Congressional complaints of DOT's approval of the Northwest – Republic and TWA – Ozark Air Lines mergers. These merger approvals were made despite DOJ's objections. Jay Etta Z. Hecker, Director of Physical Infrastructure Issues, US GAO, reported to the Senate Committee on Commerce, Science, and Transportation, "DOT has not taken enforcement action against airlines for alleged anticompetitive behavior concerning airline mergers and predatory practices..." (Senate Committee *Aviation competition: Challenges in enhancing competition in dominated markets*, 2001, p. 3).

Alliances, feeder airline arrangements, code-sharing, and foreign investment in US airlines also require government approval, but at a lower standard than mergers. However, as often is the case, one merger or alliance between Incumbents often begins a cascade of mergers or alliances throughout the industry. Thus, when Northwest acquired a 12.7% stake in Continental in 1998, United in response proposed an alliance with Delta, and American proposed an alliance with US Airways (US GAO, 1999b). In reaction to merger discussions between Delta and Northwest (Bailey, 2007b), Continental and US Airways opened merger discussions with United.

Definition of Predation and Predatory Behavior

Not only does DOJ or DOT consider the Sherman Act in overseeing the airline industry, it considers behavior that is anti-competitive, or more specifically, predatory. Predatory behavior is defined as "...foregoing of maximum current profits in order to eliminate competition or deter or delay entry, so that greater profits can be earned in the long run" (Dodgson, Katsoulacos, & Pryke, 1990). Predation occurs when a "company deliberately pric[es] below marginal cost on certain routes and carr[ies] a loss until it has driven a rival on those routes out of business, after which it again raises prices to a monopoly level" (Greig, 2005, p. 96). Predation "...keeps alive the possibility that future entrants will also meet an aggressive response and, if this possibility is sufficiently unattractive to these entrants, they may be deterred" (Milgrom & Roberts, 1990). The goal of predation

is to earn higher profits in the long run by taking actions that weaken rivals and influence the market structure (Gannon, 2005). The U.S. Supreme Court ruled in *Brooke Group Ltd. v. Brown & Williamson Tobacco Corp.* (509 U.S. 209 (1993)) that the predation standard (Brooke Standard) to be used in an oligopoly is where there is recoupment of losses caused by prices below cost via subsequent monopolization, and injury to competition in the relevant market. To meet the Brooke Standard three essential elements must be achieved:

1. Prove that prices were below cost using an Areeda-Turner type test that is generally accepted by courts;
2. predatory pricing scheme would likely injure competition in the relevant market; and
3. plaintiff must show either a “dangerous probability” or a “reasonable prospect” of recoupment via subsequent monopolization (Gillen & Lall, 2005).

There is considerable disagreement in the economics field as to whether predatory behavior is rare. The Standard Oil case of 1911, the gold standard of predation for the courts, concluded that Standard Oil acted in a predatory manner and was divided into several companies. The conventional wisdom from 1930 to 1960 was that predatory pricing was a common and rational process, often referred to as the Harvard school of thought (Zuckerman, 1998). John S. McGee, an economist at the University of Chicago, reviewed the Standard Oil case, and concluded in 1958 that there was no evidence that Standard Oil exhibited

predatory behavior. This study became the basis for the Chicago school, which concluded that predatory pricing is extremely rare because after driving a competitor out of business and then raising prices, the would-be monopolist attracts new competitors into the market (Zuckerman, 1998). The Chicago school is the basis for the Supreme Court's Brooke Standard: in the long run the market will adjust and new competitors will enter the market. The federal courts concluded,

Since the goal of antitrust law is to protect consumers against unfairly high prices, the courts have long held that anyone claiming to be the victim of predatory pricing must not only prove that the alleged predator is charging prices below cost, he must also prove that the predator can make back the money lost as well as additional profits (Zuckerman, 1998, p. A15).

A post-Chicago school later developed, based on game theory, strategic behavior, and new economic theories and modeling: "...successful predatory pricing strategies are not as rare and irrational as the Chicago school thought, especially when combined with a variety of exclusive deals and other tactics that don't involve price" (Zuckerman, 1998, p. A15). Post-Chicago thinkers believe in market forces, but recognize that sometimes the market does not function correctly and government intervention is needed. The post-Chicago school formed the basis for the government's antitrust cases against Microsoft, McCormick and Co., Anheuser-Busch, 3M, and American (see U.S. v. AMR Corp., American Airlines, Inc., and AMR Eagle Holding Corp. (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000)).

The New Entrant is most vulnerable to predatory behavior on the part of Incumbents at the time that it establishes a new airport presence and begins to

acquire gates, airplanes, staff, and CRS services. The real barriers to entry depend on the asymmetries of resources between Incumbents and New Entrants (Gannon, 2005). The higher the cost of entry, the greater the New Entrant's disadvantage compared to the Incumbent (Gannon, 2005). Incumbents can increase New Entrants' vulnerabilities by increasing entry costs (for example by tying ground services to subleases, charging high rental rates, or exercising MII clauses to delay airport expansion projects) or responding to the New Entrant's competitive moves in a predatory manner (e.g., by flooding the market with matching fares, offering TACOs and bonus FFPs) (Gannon, 2005). For example, Southwest entered Detroit Airport only to leave soon afterwards, and tried to enter Minneapolis Airport. Southwest blamed Northwest's TACOs for its failure at Detroit (US GAO, 1996), where Agents received bonuses if they steered passengers to Northwest flights. Since most gates at Minneapolis Airport were leased to Northwest, Southwest had to sublease gates from Northwest, tied to costly ground services (US FAA/OST, 1999a). Southwest decided not to enter the Minneapolis Airport or any other gate constrained airport. Both of these, TACOs and tying, are examples of predatory behavior. But only tying is illegal under the Sherman Act.

Northwest Airlines, Inc. v. American Airlines, Inc. (1992) and Continental Airlines, Inc. v. American Airlines, Inc. and AMR Corp. (1992) (cases consolidated in District Court (Northwest and Continental v. American et al. (1992))

The airline industry was already subject to DOJ antitrust oversight in a previously discussed case in Section 2, *U.S. v. Airline Tariff Publishing Co. et al.* ("U.S. V. Airline tariff publishing co, Alaska Airlines, American airlines, Continental Airlines, Delta air lines, Northwest airlines, trans world airlines, united air lines, and usair," 1992). DOJ accused the Incumbents and their co-owned Airline Tariff Publishing Co. of using CRSs to signal competitive intent and strategy and fix air fares (Sanchez, 1994). While this case was settled without admission of guilt, it put the antitrust spotlight on the airline industry. *U.S. v. Airline Tariff Publishing Co. et al.* ("U.S. V. Airline tariff publishing co, Alaska Airlines, American airlines, Continental Airlines, Delta air lines, Northwest airlines, trans world airlines, united air lines, and usair," 1992) and the two cases discussed below is intended to further the reader's understanding of antitrust behavior by Incumbents to maintain Hub and Spoke dominance and above industry rents, and the government and competitors' efforts to halt such behavior.

In *Northwest and Continental v. American et al.* ("Northwest (g-92-266) continental (g-92-259)," 1992), Northwest and Continental challenged American's "value pricing" program, which cut fares by 50%. The two airlines alleged that the program was an attempt by American to intentionally incur large losses while driving them out of business, this in violation of the Sherman Act (O'Brian & Hirsch, 1993). The allegation continued that American knew that their competitors could not afford the large losses they would incur if they matched American's fares and, that in fact, they had lost almost one billion dollars (O'Brian

& Hirsch, 1993). Northwest and Continental alleged that American would raise prices and recoup losses after American's "value pricing" program "...bled them to death" (Jones, 1993b, p. D3). Northwest and Continental sought one billion dollars in damages, which would have tripled under antitrust laws and could have forced American into bankruptcy (Jones, 1993a).

American contended that it was trying to lead the industry in fare simplification: in lieu of hundreds of different fares, it wanted to institute a more "rational" four-tier fare structure. In an interview with the British Broadcasting Corp., and as reported in the October 8, 1992 edition of *Aviation Daily*, a trade journal, Robert Crandall, CEO of American said,

I believe in value pricing, but we have abandoned it... We're going to file every cockamamie fare anybody else wants to file. If the industry simply will not coalesce around a particular fare structure, then no carrier can. We tried to provide some price leadership, but it didn't work, so we are back into the death by a thousand cuts (O'Brian, 1992, p. B1).

The *Wall Street Journal* noted, "American appears to be giving up its role as an industry's price-setter..." (O'Brian, 1992, p. B1). However, as in the Northwest and Continental lawsuit, American's market dominance, its attempted role as the industry's price-setter, and its simplified value pricing system made it subject to claims of predatory behavior.

On the witness stand, Mr. Crandall denied using the April 1992 "value pricing" program as a means to force Continental and Northwest out of business or that he improperly tried to pressure Northwest's President, John Dasburg, to raise fares (O'Brian & Hirsch, 1993). "I was out to change the way we do

business... I can't change the way they, Northwest and Continental, do business, only they can do that," said Mr. Crandall (O'Brian & Hirsch, 1993, p. A3).

Jurors concluded that American did not try to drive weaker competitors out of business with predatory prices (Jones, 1993ab). American also countersued Northwest over the hiring of a dozen American pricing and marketing executives (O'Brian & Hirsch, 1993), countersuits being a typical airline industry response.

U.S. v. AMR Corp., American Airlines, Inc., and AMR Eagle Holding Corp. ("U.S. V. Amr corp. Et al," 2000) (U.S. v. American et al. (2000))

In U.S. v. American et al. ("U.S. V. Amr corp. Et al," 2000), DOJ accused American of:

1. Driving three New Entrants, Sun Jet, Vanguard Airlines, and Western Pacific, out of Dallas Airport by undercutting their fares from 1995 to 1997;
2. incurring large short-term losses (Labaton, 2001);
3. monopolizing or attempting to monopolize seven routes — Dallas Airport to Colorado Springs, Kansas City, Long Beach, Oakland, Phoenix, and Wichita;
4. expecting to develop a reputation for predation that would deter future New Entrants; and
5. extending its monopoly to forty other routes (Gillen & Lall, 2005).

Future monopolization was alleged to allow American to recoup its earlier losses from below cost pricing. Ed Faberman, Executive Director of Air Carrier Association of America, a trade group of small airlines including Vanguard Airlines, said of DOJ's lawsuit against American:

...I think the Justice Department ultimately looked at this industry and concluded there are fewer competitors than before, this behavior has to stop and that they had to send a message. It's a very important message sent not only to the large carriers, but the industry (Labaton, 2001, p. C10).

These accusations were based on evidence the DOT's General Counsel, Nancy E. McFadden presented to the House. When testifying before the House Committee on the Judiciary, on its review of predation in the airline industry, Ms. McFadden said:

... the Department has received an increasing number of complaints by smaller airlines that the largest airlines are using unfair tactics to keep them from getting a foothold ... at hub airports... we have shaped a policy that targets only the most egregious conduct... We have no intention of reregulating the airline industry... We do not wish to stifle legitimate competitive responses to new entry, which provide the lasting benefits to consumers that deregulation should bring. The unfair exclusionary behavior ... [is] predation within the meaning of the federal antitrust laws (House Committee *The state of competition in the airline industry*, 1998, pp. 7-9).

DOT, in "Enforcement Policy Regarding Unfair Exclusionary Conduct in the Air Transportation Industry," dated January 17, 2001, proposed to declare unlawful "incumbent airlines ... respon[s]es... to new competition with fare cuts, capacity increases and other practices that are apparently designed to eliminate or reduce competition" (Greig, 2005, p. 98). DOT sought to eliminate Incumbent's behavior that:

1. Sacrifices more revenue than all of the New Entrant's capacity would have diverted from it, or
2. short-term operating results are substantially worse than would be a reasonable alternative competitive response to New Entrant (House Committee *The state of competition in the airline industry*, 1998).

However, after the financial crises of the 9/11 terrorist attacks, the 2001 recession, Gulf War II, and high fuel prices, the DOT proposal was dropped.

Evidence from the DOJ case against American revealed that American developed a number of strategies aimed at low cost New Entrants because American believed they represented a serious threat to its revenues and, in particular, to its Dallas Airport hub (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000). American observed the effects of New Entrants at Denver and Atlanta Airports, hubs for United and Delta, respectively. American's analysis of ValuJet's, a low cost New Entrant, impact on Delta at Atlanta Airport was an estimated loss in revenues of \$232 million per year due to Delta's pursuit of a short term, non-aggressive pricing strategy (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000). Once Delta began to more aggressively match ValuJet's fares, erosion of Delta's market share stopped.

American developed a strategy of capacity additions in select markets and strong price matching, based on its experience against Midway Airlines, another low cost New Entrant. American admitted that this strategy would "... definitely be very expensive in terms of AA's short term profitability" (U.S. v. American et al.

"U.S. V. Amr corp. Et al," 2000, p. 17). American formed a Strategy Working Group to deal with low cost New Entrants, including their Pricing and Yield Management, Capacity Planning, Sales Planning, Marketing Planning, Airline Profitability Analysis, and Eagle Pricing and Yield Management Departments and Sabre Decision Technologies, its CRS subsidiary, led by senior executives including Donald Carty and Robert Crandall, Presidents and CEOs of American at different time periods. Using its CRS, various scenarios were stimulated regarding possible competitors' responses to American's competitive actions using competitors' data, including costs, scheduling practices and projected schedules, share, load factors, and profit impacts.

American's report, "Caribbean Strategy Issues," stated, "American's ultimate strategy ..., particularly with regard to capacity levels, is likely to send a message to our competitors about our willingness to defend our market position... Any strategy decision should be made with this in mind" (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000, p. 73). American was successful in forcing Midway Airlines to exit the Dallas Airport – Midway Airport route in March 1995 (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000). Vanguard Airlines, a New Entrant, began flying out of Dallas Airport in 1994, having chosen not to compete with Southwest because those fares were already low. American matched fares and bracketed Vanguard Airline's flights. Vanguard Airlines declared bankruptcy in 2002. Western Pacific, a New Entrant with a Colorado Springs hub, began service to Dallas Airport. American created an Agent

incentive program in Colorado Springs to steer passengers to its flights. In 1997, Western Pacific declared bankruptcy. Sun Jet, another New Entrant, entered the Dallas Airport – Long Beach Airport market after American “abandoned” the market due to insufficient traffic. Sun Jet personnel and previous management advised Sun Jet’s new management not to add a third flight to Dallas Airport. In fact, Sun Jet operated on a strategy of not flying more than two frequencies on any single route to avoid a response by an Incumbent and to remain below the Incumbent’s “radar.” When Sun Jet’s new management expanded Dallas Airport services, American responded with increased flights and matched low fares. Sun Jet filed for bankruptcy in 1997. Legend Airlines had a strategy directed to business travelers and began service out of Love Field Airport to avoid American. However, it was constantly in litigation with American and declared bankruptcy in 2000.

Regarding the four allegations against American, pricing below costs, recoupment, reputation for predation, and monopolization by reputation, the District Court of Kansas found the following.

1. American’s prices only matched New Entrants’ prices but never undercut them on the four routes in question. Based on *Richter Concrete Corp. v. Hilltop Concrete Corp.* 691 F.2d 818, 826 (6th Cir. 1982), “It is not anticompetitive for a company to reduce prices to meet lower prices already being charged by competitors” (*U.S. v. American et al. “U.S. V. Amr corp. Et al,”* 2000, p. 114).

2. The government failed to prove that American would subsequently recoup its losses by supracompetitive pricing, a high standard that is not easy to establish (*Brooke Group*, 509 U.S. at 224-25). The Brooke Standard requires analysis that is focused on “an estimate of the cost of the alleged predation and a close analysis of both the scheme alleged by the plaintiff and the structure and conditions of *the relevant market*” 509 U.S. at 226 (emphasis added by the District Court) (*U.S. v. American et al.* “*U.S. V. Amr corp. Et al.*,” 2000, p. 129). In fact, the alleged barriers to entry are not conclusive when actual entry by New Entrants had occurred (*2A Areeda & Hovenkamp*, ¶ 420b at p. 58). Airport real estate such as gates and ticket counters were readily available to New Entrants in this case as was a program by Dallas Airport authorities to cooperatively advertise New Entrants.
3. Because the District Court found that American was not proven to be able to recoup its losses, it therefore could not be found guilty of a “reputation for predation.” “It is clear that a reputation for aggressive, but wholly legal competition may also intimidate would-be competitors,” said the District Court, including New Entrants’ fear of Southwest’s vigorous competition that they sought to avoid as well (*U.S. v. American et al.* “*U.S. V. Amr corp. Et al.*,” 2000, p. 130).
4. Because the District Court found American not guilty of predatory pricing, it could not accept DOJ’s argument that recoupment in American’s

core markets extend to additional markets. The District Court found the DOJ's reach deeply troubling, because, "Faced with such an exponential increase in the already significant consequences of Sherman Act liability, many firms may be rationally tempted to forgo aggressive but lawful price competition" (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000, pp. 133-134).

In the course of this decision, The District Court made observations about the Hub and Spoke which provide the Incumbent advantages, including their significant economies of scale, scope and density leading to lower costs per passenger, frequency and scope of service, product differentiation, and hub premium, therefore allowing the Incumbent to obtain a disproportionate share of traffic and revenues. American's price-variable cost margins were higher for flights originating at and departing from Dallas Airport compared to other flights in its system. These advantages, including above industry rents, led New Entrants to try and obtain a share of a lucrative market and American to vigorously defend its market.

The District Court continued, arguing that New Entrants can expect a response from Incumbents, and New Entrants are most vulnerable at the time of entry. The greater the capital requirement to establish itself, the greater the initial New Entrant's disadvantage (Gannon, 2005). The Incumbent's response is driven by two responses: the size of the disadvantage facing the New Entrant (or height of barrier) and the size of the additional cost the Incumbent may impose

on the New Entrant (depth of response damage) (Gannon, 2005). There are multiple types of barriers in this case. Structural barriers such as an Incumbent's brand, sunk costs such as business lounges, and networks (Gannon, 2005). Institutional barriers include things like grandfathered slots, long term airport leases, and standard ways of managing airport relationships (Gannon, 2005). Behavioral or strategic barriers are Incumbent's response for example, "trashing and bombing," TACOs, bracketing flights, matching fares, and deep resources to withstand a New Entrant's entry (Gannon, 2005). The DOJ appealed the American case to the 10th Circuit Court of Appeals (Labaton, 2001) but the Appeals Court affirmed the decision of the District Court (Gillen & Lall, 2005). Critics of deregulation said that New Entrants were under unfair competition from Incumbents. However, the District Court (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000) found that low cost New Entrants had made inroads into major hubs based on the DOJ's own data: JFK, La Guardia, and Newark Airports were served by nine low cost carriers with a 9.7% market share; Chicago's Midway and O'Hare Airports were served by six low cost carriers and Southwest with a market share of 12.3%; Denver Airport's low cost carriers had 15.3% of the market; Atlanta Airport's low cost carriers had 16.8% of the market; Detroit Airport's low cost carriers had 9.19% of the market; and New Entrants serving Dallas' Dallas and Love Field Airports had 26.4% of the market in the third quarter of 2000.

Sherman Act: Unfair Competition

While antitrust law is a significant weapon against Incumbents and their Hub and Spokes, the standard for predation is high, and the DOJ and competitors were unable to prove predation. However, the antitrust rulings listed below diminished Incumbents' hold over their Hub and Spokes, as did the antitrust spotlight.

1. The City of Dallas unreasonably and with unjust discrimination denied Southwest access to Love Field Airport; such discrimination is objectionable because of the anticompetitive effect it has on airlines and the public (*City of Dallas v. Southwest Airlines Co.* 371 F. Supp 1015 (N.D. TX 1973); affirmed 494 F.2d 773 (5th Cir), cert. denied 419 US 1079 (1974)).
2. Regulations on noise levels must be reasonable, non-arbitrary, non-discriminatory, and only when justified. PATH delayed airport access when the Concorde met the decibel-based noise standard (*British Airways Board v. Pt. Authority of NY and NJ* 558 F.2d 75 (2nd Cir. 1977) and 564 F.2d 1002 (2nd Cir 1977)).
3. Delaying or banning access to airports for more than two years is considered excessive and illegal (*Arapahoe County Public Airport Authority v. FAA*, Case 99-9508 (10th Cir) (1999)).

Airport Compliance Requirements: FAA Order 5190

The FAA, in response to Congressional efforts and court orders to encourage New Entrants, issued a number of Airport Compliance Requirements (see FAA Order 5190 in Appendix C). The FAA has strong regulatory authority over airports, including but not limited to the power of the purse, the provision of critical air traffic controllers, and the power to intercede for safety and security reasons. The FAA sought to make airport authorities more proactive in:

1. Aiding New Entrants to obtain economical and non-discriminatory terms in their subleases with Incumbents;
2. not protecting Incumbents;
3. not relinquishing airport control to Incumbents;
4. not unreasonably delaying approvals for New Entrants' access or legal agreements;
5. not denying Signatory Lessee status to New Entrants if the reason the status is unavailable is due to airport policy or lack of facilities; and
6. in general, assuring terms, rates, and charges imposed on all airlines are fair, reasonable, and applied without unjust discrimination.

Because airport leases cover long time periods, it is difficult if not impossible to change terms that are beneficial to Incumbents quickly. Even with new leases, airport authorities told the GAO, "...airlines are resisting ... by refusing to sign new leases with less restrictive terms and even by going to court to try and force long-term agreements and majority-in-interest agreements which give airlines

some control over expansion decisions” (US GAO, 1990b, p. 41). Despite years of effort to open airports to New Entrants, the FAA’s efforts continue to meet Incumbents’ resistance.

Conclusion

The airports themselves serve as a restriction on unlimited entry to all “fit, willing, and able” airlines. This condition existed before Deregulation and continues today, with restrictions increasing as congestion and flight delays mount. However, it is not just the physical limitations of airports, sufficient real estate, long runways, or environmental conditions, that constrain entry, but long-standing practices and procedures of airport authorities, airlines, and bond markets that limit the expansion of airports and thus competitive entry. How airport capital projects are funded shows how these three stakeholders encourage or inhibit airport expansion to accommodate New Entrants. The state of limited federal, state, and local airport funding and the on-going reliance on Incumbents to fund such infrastructure, who themselves are severely financially constrained, raises issues as how to accommodate growth by not only New Entrants and Incumbents, but international airlines as a result of Open Skies agreements.

The role of the government has been described as it attempted to increase New Entrants in key airports, particularly slot-controlled airports. Those efforts have for the most part been ineffectual, or at worse, have had the unintended effect of increasing Incumbents’ dominance. Because airport and

airspace infrastructure have not kept up with demand, slot-controls are being reinstated at JFK and Newark Airports. This leads to the ability of Incumbents and New Entrants located at slot-controlled airports to maintain hub premiums, especially as demand increases at international gateway airports such as JFK, Newark, and O'Hare Airports.

We have also seen how government and competitors' efforts to enforce antitrust laws against Incumbents have had a significant effect on Incumbents, particularly the regulatory spotlight that American has endured for decades. While American was able to receive favorable decisions in two of the lawsuits described in this Chapter, it nonetheless took critical time from management, including the president and CEO, to mount a defense. During this time, which spanned a period of eight years, it hindered American's ability to implement other strategies that might have added to the airline's key resources. The dampening effect of the regulatory spotlight was felt not just on American, but as DOT's General Counsel, Nancy E. McFadden testified, included "the largest airlines" (House Committee *The state of competition in the airline industry*, 1998). More particularly, if American had been able to bring "fare simplification" and a "rational four-tier fare structure" to the industry (O'Brian, 1992), it might have provided the industry with better financial returns. However, after the lawsuits initiated by Continental and Northwest ("Northwest (g-92-266) continental (g-92-259)," 1992) and the DOJ for American's predatory pricing (U.S. v. American et al. "U.S. V.

Amr corp. Et al," 2000), it is doubtful if any airline wants to undertake the task in the future that may lead to better financial returns for the industry.

Now that we have reviewed the three major stakeholders in airports, Incumbents, New Entrants, and the government, we will analyze the Hub and Spoke as a radical innovation and its implications.

CHAPTER 10

IMPLICATIONS OF THE HUB AND SPOKE EXPERIENCE

Chapter 6 traced the history of the evolution of the Hub and Spoke into a significant strategy barrier by Incumbents. Chapter 7 showed the evolution of the Point-to-Point route network developed first by Southwest, and then other New Entrants, as they tried to enter the industry. Chapter 8 and 9 covered the complex government effort in overseeing the national airport and airspace system. Chapter 8 described how airports function fiscally and how a complex network of local government, federal financing and oversight, and bond markets operate to provide this critical access point to the national airspace. Chapter 8 also covers three of the four major crises confronting the airport system: environmental considerations, federal regulations and court rulings, and EASP. Chapter 9 deals with the fourth crisis facing airports, namely antitrust actions.

The Hub and Spoke case study is particularly complex because of the conditions that existed prior to Deregulation and continue today: congested large and medium-sized airports and national airspace overseen by the FAA, local government ownership of airports which is also subject to FAA oversight, public and private financing for airport expansions or major construction, and environmental concerns. While policy makers considered the airline industry to be contestable because "airplanes are mobile," access to key airports became the focus of competition between New Entrants and Incumbents. Incumbents, ensconced in key airports, thwarted efforts to open airports to New Entrants and

used their control of Hub and Spokes to create barriers to entries and extract above industry rents. The government, seeking to open key airports and employ free market forces, instituted various policies to eliminate Incumbents' hub barriers. In the end, a series of crises, mainly financial, and the re-emergence of Point-to-Point network led to the dominance of low-cost New Entrants and the flight of Incumbents to international markets. The tensions between free market and empty core perspectives are clearly played out in this case. Free market proponents seek the dismantling of Hub and Spoke barriers and the privatization of airports, the FAA, and air traffic controllers. Empty core theorists say unremitting competition eliminates profits and forces airlines to seek more profitable venues to survive such as international hubs. The role of crisis and innovation are apparent throughout the case as both Incumbents and New Entrants attempt to survive in an increasingly distressed industry and access customers at key airports.

Cycle of Innovation

A critical element of the Airline Deregulation Act of 1978 was unlimited market entry and exit for Incumbents, New Entrants and other airlines which would create a competitive, innovative, and a financially healthy industry. The basic proposition of this thesis is that crisis provokes innovation. The industry was faced with a multitude of crises – competitive, economic, regulatory, and civil, which allows us to explore this relationship between crisis and innovation. In particular, it allows us to understand how an operations solution like a Hub and

Spoke system efficiently used to manage flights and passengers through a route network, came to be used as a radical innovation to create barriers of entry and above industry rents.

Examples of crisis and innovation are evident throughout the case. The first crisis occurred when slot- and perimeter-controlled National Airport could not provide enough takeoff and landing slots for Incumbents and New Entrants. Prior to Deregulation, CAB granted scheduling committees, made up of Incumbent slot owners, antitrust exemption to coordinate schedules and trade time slots. This method of dealing with entry and exit into a physically constrained airport worked in a closed environment, but collapsed when New Entrant New York Air wanted 24 slots during prime time to create a competitive alternative to Eastern's East Coast Shuttle (Feazel, 1980). CAB responded to this crisis by threatening to reduce Incumbents' slot allocations. Incumbents were reluctant to give up any slots, and one Incumbent, Northwest, sued CAB when it lost slots. Cities that had access to National Airport demanded they retain control of their slot access, only to find that Incumbents owned slots, not they. This crisis brought to everyone's attention the value of slots at JFK, LaGuardia, National, and O'Hare Airports. Without slot access at the right times and in sufficient numbers (i.e., weekday mornings and evenings), a New Entrant or any other airline could not enter the market and provide viable service. If slots were taken away from Incumbents they could not use their airport assets (e.g., ticket counters, baggage claim areas, waiting rooms, equipment) that cost millions of dollars and realize a return

on investment. Slots became a key resource and a barrier to entry. Incumbents began to devise ways to use slots and their airport real estate to block competitive entry and to incorporate slot-controlled airports into their Hub and Spoke route networks.

The second crisis was Southwest's inability to access key airports. Southwest chose to create its hub and headquarters at Dallas' Love Field Airport which was being replaced by newly built Dallas Airport. Love Field Airport was to be decommissioned as a commercial airport or its commercial use severely curtailed. Seven years of litigation over access to Love Field Airport led Southwest to create the 10-minute airplane turnaround (Aviation Week & Space Technology, 1976b), leading to one of the industry's highest airplane utilization rates, and a Point-to-Point route network. Southwest created a strategy to operate out of smaller, older metropolitan satellite airports such as Love Field, Houston Hobby, and Midway Airports. The advantages included not only ample space and lower costs, but in the early deregulation years kept Southwest from head-to-head competition with Incumbents, and allowed Southwest to grow (Knorr & Arndt, 2005). Thus Southwest's reaction to the crisis of a lack of airport access created its own innovation and provoked ongoing crises for competitors.

The Hub and Spoke system was a radical innovation. As discussed in detail previously, Benner and Tushman (2002) and Abernathy and Clark (1985) defined a radical innovation as an innovation that fundamentally changes the technological trajectory and is designed for new or emergent customers. Delta

created the Hub and Spoke at its Atlanta Airport hub and headquarters as an operations solution to manage its fleet and route system in the 1950s. When Deregulation allowed any “fit, willing, and able” airline to fly anywhere, the ability to limit competition at key airports became a significant competitive advantage and allowed airlines to increase market share, decrease costs, and obtain above industry rents. Incumbents changed the technical trajectory of Hub and Spokes from purely an operations solution to a strategic solution by creating hub barriers to maintain or increase market control and block competitive entry.

Radical innovations provide their creator with new and emergent customers via follow-on innovations. The Hub and Spoke and its follow-on innovations provide these future technologies, products, and services (Rosenkopf & Nerkar, 2001; Trajtenberg, 1990):

1. Allows passengers to fly from one small city or town to an array of locations, including foreign destinations, with relatively high frequency.
2. Allows freight to be similarly one “spoke” away from its ultimate destination thus enabling the globalization of business and the development of just-in-time delivery of key supplies. Airlines are now a key part of the supplier value chain or distribution chain.
3. New customers include all passengers worldwide, whether from feeder airlines that fly passengers from small cities and towns to Incumbents’ hubs, code share alliance partners, or foreign alliance partners.

4. Expands the use of computer reservation systems (CRS) and its follow-on innovations in conjunction with Hub and Spokes to increase Incumbents' control of hubs:
 - a. Price signaling,
 - b. disciplining other airlines,
 - c. TACOs,
 - d. FFP, and
 - e. yield management software.

5. Developed the follow-on innovation — the alliance, whether feeder airline alliances, code sharing alliances, Incumbent-to-Incumbent alliances, or international alliances. These alliances significantly add to a company's ability to expand its global and domestic reach at relatively low costs and low risks. DOT believes "...that linking networks on different continents may allow airlines to create better quality and more competitive service in literally thousands of markets around the globe..." (House Committee *The state of competition in the airline industry*, 1998, p. 2).
 - a. Alliances allow airlines to avoid more stringent antitrust reviews and bypass bi-lateral foreign agreements, and
 - b. provide customers with seamless travel — a "single" airline, with check-in, baggage handling, ticketing, FFP, shared airport lounges, and fare sharing that often is cheaper than buying tickets from each separate alliance member (US GAO, 1999b).

- c. Alliances have spread within the travel related industries (e.g., hotels, car rental companies, cruise lines) and are prevalent in the business world (e.g., pharmaceutical and Internet industries).

Haroff et al. (1999) defined radical innovations as providing a company with above industry rents, which was clearly the case after airlines used Hub and Spokes to block competitive entry and increase market share. Government agencies attempted to break up Incumbents' control at Concentrated Airports where Incumbents achieved above industry rents as shown in Chapter 6. Hub premiums continued throughout the study period, particularly at slot-controlled airports as shown in Appendix H. Despite years of government efforts hub premiums remain at Concentrated and slot-controlled airports. Finally, because the FAA controls the national airspace and has not received adequate funding for airport expansion and equipment for decades, airports and airspace are increasingly congested. An effort to create competitive entry at slot-controlled JFK Airport was thwarted by congestion. The 2007 partial removal of slot controls allowed Incumbents and New Entrants to increase flights that caused one to two hour delays, which in turn, rippled through the domestic and international airspace. Therefore, it is likely that hub premiums will continue as congestion forces the government to reinstate or maintain slot controls that limit increased competition.

Thus, the change of the Hub and Spoke from an operations solution to a competitive strategy was a radical innovation that fundamentally changed how airlines competed, created a world-wide customer base and follow-on innovations, and provided Incumbents the ability to block competitive entry and gain above industry rents. This finding is in agreement with Raider's (1998) findings that "constrained industries use research and development to break out of constrained positions to increase market share, open new markets, ... and improve quality or increase profit margins."

New Entrants attempted to enter large and medium-sized airports only to be confronted by Incumbents' hub fortresses that either forced New Entrants into bankruptcy or into alliances. Southwest, however, chose to enter new markets at smaller, metropolitan satellite airports, a radical innovation, opening up underutilized airports to handle increased passenger demand caused by deregulation. Low-cost New Entrants such as Southwest opened air travel to people who usually traveled by car, rail, bus, or did not travel at all. Southwest avoided head-to-head competition with Incumbents, or as Access Air, another New Entrant, said, "stay off of elephant paths..., don't eat the elephant's food..., and keep the elephants more worried about each other than they are of you" (U.S. v. American et al. "U.S. V. Amr corp. Et al," 2000, p. 73). By buying time to build resources and become a formidable competitor, Southwest was able to vault into the number one domestic passenger position in 2007. Southwest flew Point-to-Point from lower cost and less congested airports, and increased their

airplane utilization, a significant follow-on innovation that, combined with other factors such as good employee relations and fuel hedging, allowed Southwest to maintain low costs and fares and earn profits for 35 consecutive years. This radical innovation became templates for JetBlue, a New Entrant in 2000, Allegiant Air after its emergence from bankruptcy in 2003 (Bailey, 2006a) and Ryanair, a European New Entrant.

Like the Hub and Spoke, the use of satellite airports changed the competitive strategies of the airline industry once again, embraced new or emergent customers, and provided follow-on innovations, and above industry rents. This finding is in line with Raider's (1998) findings that firms that faced strong, oligopolistic buyers and suppliers had higher rates of innovation and research and development investments.

Hub and Spokes and the critical skills and knowledge to manage them became a key resource (Penrose, 1959; Wernerfelt, 1984). Hub and Spokes allowed Incumbents to survive the onslaught of New Entrants and competition and produce profits. Key resources are those resources that are rare, valuable, have few substitutes, and are difficult to imitate (Barney, 1991). At Deregulation large and medium-sized airports were congested, and five airports were so congested that slot controls were imposed. Many of these airports are located in dense urban areas and with growing concerns for safety, noise, and environmental issues, expansion is difficult if not impossible. There are limited numbers of airports, with few proposed (Denver Airport is the only new airport

since Deregulation). Of the existing large and medium-sized airports, access to them is limited by long term-term leases, standard airport practices and procedures, financing methods, and airport authorities and Incumbents' self interests. As the number of passengers and congestion increases, all airports, whether large, medium, or satellite, are becoming increasingly rare, valuable, have few substitutes, and are difficult to imitate.

First mover advantages (M. B. Lieberman & Montgomery, 1988) allowed United to create a Hub and Spoke strategy while other Incumbents remained doubtful of this strategy (Aviation Week & Space Technology, 1980k). In creating its Hub and Spoke strategy, United officials "...believe [it] will brace the carrier against an expected downturn ... associated with the recession and the effect of fuel ..." (Aviation Week & Space Technology, 1980j, p. 34). This strategy allowed United to strengthen its O'Hare Airport hub, eliminate Continental from O'Hare Airport (Aviation Week & Space Technology, 1980k; Kozicharow, 1979), and create a Western hub at Denver Airport. Aviation Week & Space Technology described Incumbents' route networks as they quickly mimicked United:

New strategies call for expansion in safe routes that are connected with hub-and-spoke systems, either increasing frequency from strongholds or adding connecting routes... Carriers are developing spheres of influence centered in their hub systems, and they are seeking to strengthen their positions in order to meet any challenges that could come from other carriers (Aviation Week & Space Technology, 1980k, p. 71).

Delta and Northwest, both financially strong in comparison to other Incumbents, moved slowly and cautiously in expanding routes (Aviation Week &

Space Technology, 1980k). While Delta created the Hub and Spoke and repelled United from its Atlanta Airport hub in 1979, it was slow to use the Hub and Spoke in its new radical form. Continental spent considerable resources restructuring from a linear route system to a Hub and Spoke, but ultimately failed and was purchased by Texas Air in 1982. American moved its headquarters to and created a hub at Dallas Airport in 1978 and was a second mover behind United in developing Hub and Spokes. American quickly became the most effective user of the Hub and Spoke as a competitive strategy, just as it had in the use of its CRS. American created a number of follow-on Hub and Spoke innovations: predatory behaviors; passenger facility charge (PFC) funding for Incumbent's benefit; and acquiring feeder airlines. Both American and United used their CRSs to strengthen their Hub and Spokes.

Rare, valuable, hard to imitate, and with few substitutes, key airports, particularly those that are slot-controlled, are a key resource. With the rise of the satellite airports and Point-to-Point low-cost New Entrants, the value of hubs has diminished and Incumbents have sought more lucrative overseas routes and hubs.

Impediments to Hub and Spoke Development

At this point we may ask how the development, diffusion, and dominance of the Hub and Spoke is best explained, particularly with the industry skeptical of United's strategy. Clearly, a Hub and Spoke required a focused strategy and heavy investment. It was clear that Incumbents, including United, wanted to

jettison short-distance routes, which they and CAB perceived as unprofitable and needing subsidies. United's Hub and Spoke strategy was to connect stronghold markets; connect long-distance trips but not short-distance trips; avoid strong competition; and fly from a stronghold city to a destination (Aviation Week & Space Technology, 1980j). The primary strategy, however, was to eliminate short-distance trips as United moved from 255 of the 1,000 largest routes in 1978 to 544 by 1988 (see Chapter 6). Also, United and other airlines invested in large, wide body airplanes in the 1960s and as part of their new strategy were to use their larger airplanes on longer, denser market segments (Standard & Poor's, 1982a) and to sell or ground smaller, less fuel efficient, and noisier airplanes (Aviation Week & Space Technology, 1980j). High fuel costs and shortages forced United to execute its strategy quickly as well as the FAA's required retirement or retrofit of noisier airplanes by 1985. By utilizing the Hub and Spoke strategy, United took advantage of its resources — stronghold airports and large airplanes — which represent sunk costs and irreversible resource commitments to specific strategies (Ghemawat, 1991) and lumpy resources (Pettus, 2001). United's resource reorientation reflected the need to respond to an environmental shift caused by Deregulation.

United wrote-off significant capital improvements as well as made lease termination payments to airport authorities, or if leases could not be terminated, continued lease payments for unused or underutilized airport space. While United had the fourth best debt to capital ratio in 1978 (see Chapter 4) Hub and

Spokes required scarce financial resources, management attention, and relocation of employees during a major recession and as United recovered from a labor strike. Resource conversion requires some admission of management mistakes, explanation of strategy changes, book write-offs, losses, and stockholders and lenders' concerns. Additionally, United had to face public and political complaints of abandonment of cities it had served for many years. New Entrants were not burdened by these high fixed and sunk costs, resource reorientation, and negative publicity.

In this way United instituted major change in the industry and created a radical innovation. Fear of change can cause disequilibrium in markets and threaten existing structures, markets, and positions of power. In this case, fear of change resulted in a number of industry behaviors in the Hub and Spoke's development and diffusion. For example:

1. While initially skeptical of United's Hub and Spoke strategy, Incumbents quickly mimicked the Hub and Spoke at great costs to maintain positions of power.
- 2a. Most Incumbents abandoned short-distance routes (see Chapter 6) and moved to longer routes to more effectively utilize their long-range airplanes and maintain their positions of power relative to other Incumbents. This left a vacuum for regionals, nationals, former intrastates, and New Entrants to safely enter new markets.

2b. This shift up to longer routes by all Incumbents increased the intensity of competition among both Incumbents and New Entrants, resulting in severe fare wars and diminished profits while regionals, nationals, former intrastates, and New Entrants in short-distance markets earned profits.

3. Incumbents attempted to protect long-held markets from New Entrants, Incumbents, and other airlines despite the fact that they were unable to make a profit. This fear became the cornerstone of airline competition in the Deregulation era, where fare wars raged, despite being irrational from a pricing standpoint, because no airline would 'give up,'

Carriers continue to compete on routes where fares are so low that breakeven is nearly impossible because carrier managers expect a competitive balance to emerge – someday. Eventually, the hope is, low fares will force weaker airlines out of the markets and reduce competition enough to allow those remaining to make a profit. "We have invested a tremendous amount of money in developing these markets," one carrier official said. "We can't simply walk away. All we can do is hope that over the long term things will stabilize" (Aviation Week & Space Technology, 1980d, p. 33).

4. Each Incumbent developed a strategy to position itself in the market, relative to existing structures. United evolved a strategy to only enter markets it could win after its failure at Atlanta Airport against Delta. In contrast, American and Delta developed a strategy of buying feeder airlines at airports that were uncontested (i.e., Cincinnati and Nashville Airports).

5. American has been a close follower of United's strategy, aggressively pursuing the Hub and Spoke and creating a number of

follow-on innovations to enforce its hub fortresses and maintain above industry rents. American continues to use its Hub and Spoke and follow-on innovations to maintain its markets relative to Southwest at its Love Field Airport hub.

6. The slot committees at National Airport, comprised of Incumbents, were unwilling to make significant slot changes that threatened their profits and status at this critical slot- and perimeter-controlled airport.

7. Incumbents use of CRSs to signal competitive and strategic intent, fix air fares, and discipline those airlines that did not maintain fare levels (i.e., U.S. v. Airline Tariff Publishing Co. et al. ("U.S. V. Airline tariff publishing co, Alaska Airlines, American airlines, Continental Airlines, Delta air lines, Northwest airlines, trans world airlines, united air lines, and usair," 1992)).

8. Feeder airlines and airline alliances, follow-on innovations created by United, became a low cost, low risk method of maintaining existing structures, markets, and positions of power.

9. Foreign alliances allowed US airlines to bypass complicated bilateral government agreements and access lucrative routes and new markets. Those airlines that waited too long to mimic this strategy were often left with the weakest alliance partners (e.g., Wings Alliance collapsed after it lost its only strong European member).

Thus, we see the role of sunk costs, irreversible resource commitments to specific strategies, lumpy resources, and fear of change played in causing disequilibrium in markets and how these factors acted in the development, diffusion, and dominance of Hub and Spokes among Incumbents.

Factors in Hub and Spoke Development, Diffusion, and Dominance

United's Hub and Spoke strategy development, diffusion, and dominance occurred within the context of the airline industry, key players, and regulatory oversight. A series of crises led to rapid Hub and Spoke diffusion and dominance by United, American, and other Incumbents. These crises were all discussed in detail in previous chapters, but a review of the most significant ones follows.

1. Deregulation produced a crisis of unlimited competitive entry.

United and other Incumbents had to select a network strategy that took advantage of, or re-oriented, their resources, pruned less profitable routes, and allowed them to respond to competitive entry. That strategy was the Hub and Spoke system.

2. The crisis at National Airport, precipitated by New York Air's request for 24 prime-time slots, created a realization among airlines of the value of their slots and triggered them to use their power to legally block competitive entry and thus increase their slot control. Incumbents took advantage of the revised High Density Rules in 1985 and created hub fortresses by buying slots and manipulating rules.

3. Airports were and still are unable to expand to meet the space demands of New Entrants due to lack of federal airport funds, lease limitations with Incumbents that allow them to veto capital projects (MILs), airport bond financing, and standard operating procedures and practices of airport authorities, including self-interests. Federal airport funds, AIP and Airport Development Aid Program, are limited, with demand far outstripping funding, and the FAA chose to divert limited funds to satellite airports.
4. Medium-sized and small airports feared losing airline service as Incumbents reduced or eliminated flights.
5. Environmental issues created a major crisis for airport access at physically constrained airports. Incumbents with access to environmentally sensitive airports maintain their dominance.
6. The air traffic controllers' strike (PATCO strike) of 1981 – 1982 caused Incumbents to cut 25% of their flights at the 22 largest airports (Standard & Poor's, 1981a). While the PATCO strike reduced Incumbents' revenues, it forestalled competitive entry during a crucial period. Incumbents' large markets were protected while they had time to restructure routes, increase hub defenses, and understand the Hub and Spoke as a radical innovation.
7. Bankruptcies, mergers, and alliances consolidated the industry. Incumbents were forced to deal with the crises of managing a rapidly

changing competitive environment and the need to take advantage of a more lenient DOT in merger and alliance approvals. Mergers required managing resources such as Hub and Spokes, CRS, unions, government approval, and finance. Successful mergers and alliances allowed Incumbents to increase market shares at Concentrated Airports.

8. While the EASP provided subsidies to transition small and isolated communities during Deregulation, Incumbents, small cities, and Congress felt the public and political crisis from loss of service. Alliances with small feeder airlines, facilitated by CRS follow-on innovations, allowed Incumbents to provide service to small cities, reduce public and government pressure, increase hub densities, and increase hub market share and hub premiums.

9. The rise of predatory behaviors led to antitrust lawsuits and tacit cooperation in spheres of influence around hub fortresses. For examples see the court cases: U.S. v. Airline Tariff Publishing Co. et al. (1992); Northwest and Continental v. American et al. (1992); and U.S. v. American et al. (2000).

10. Fare wars by low-cost New Entrants like Southwest led to severe financial crises for Incumbents and the industry.

Seven of these ten crises were caused by government actions.

Government Responses and Consequences

A number of government responses to crises had the unintended consequences of increasing Incumbents' airport dominance. The most glaring case was the FAA's revision of the High Density Rules that led to Incumbents' increased slot control. However, less obvious but just as important was the political and public pressure to provide air service to small cities and towns. Incumbents, led by United, created feeder alliances that were rubber-stamped by DOT, which increased Incumbents' dominance at Concentrated Airports. This small city air service policy extended to slot-controlled airports, where new slot awards were granted from three slot-controlled airports, JFK, LaGuardia, and O'Hare Airports, to six small cities, Charleston, WV, Springfield, MO, Wilkes-Barre, PA, Chattanooga, TN, Roanoke, VA, and Tri-Cities, TN (US DOT, 1998). Slot awards to small cities and towns exacerbated demands by passengers in more densely populated cities and regions to access these airports. Demand for slots in 1996 was so great that the cost of an off-peak slot was one-half million dollars and for a peak-period slot was two million dollars (US GAO, 1996). DOT, FAA, and GAO reported that the Hub and Spoke provides high frequency service to many small cities that would otherwise not generate enough traffic to receive such service and makes it easier for passengers to secure flights that match their preferred departure and arrival times (US GAO, 1990a). On the other hand, DOT and GAO complained of fare premiums from local cities to

Incumbents' hubs and created policies to increase competitor entry. High fares to small cities may be the price to provide high frequency service.

A quick review of the government's policies with regard to airports follows:

Revisions to the High Density Rules of 1985 allowed for the sale or lease of slots and grandfathered Incumbents' slots as of December 1985. The changes also required Incumbents to "use or lose" slots and release 5% of their slots for the use of New Entrants. The High Density Rules of 1985 had the unintended consequence of allowing Incumbents to increase their control of slots.

In response to the unintended consequence of the High Density Rules of 1985, the FAA tried to eliminate a loophole for airlines with fewer than nine slots that were not subject to the "use it or lose it" provision. Incumbents sold 8 slots to airline subsidiaries or alliance partners: sales between related airlines increased by quarterly average from 14% in 1986 to 32% in 1987 and 40% in 1988. Leasing slots was considered by the FAA as using a slot, and slot leases between related airlines increased from 14% in 1986 to 24% in 1987 and 20% in 1988 (US GAO, 1990b). The 1989 revision to the High Density Rules provided an Incumbent exemption from the "use it or lose it" provision as long as the airline used the slots and did not lease them to another airline. However, by then, Incumbents were firmly in control of slot-controlled airports and were "hoarding ... excess slots" (US GAO, 1990a, p. 26). In fact, slot lease periods declined in 1996 (see Chapter 9) with very few New Entrants able to justify investments for short periods or subject to cancellation on short notice (US GAO, 1996).

Besides slot-controlled airports, the government created and maintained an environment in which large and medium-sized airports are unable to expand and new airports can not be built due to limitations of the national airspace, air traffic controllers, airports, funding, and environmental laws. Airport operating procedures and practices also limit airport expansion, as will be discussed later in this chapter. Even satellite airports are congested and their short runways cannot be expanded or reconfigured to handle larger airplanes or existing airplanes with sufficient landing safety margins in inclement weather (M. Wald, 2006).

The government actions in this arena lead to five primary effects:

1. The airports' inability to adequately fund airport expansions;
2. the inability of airport authorities to obtain GARBs without approval of Incumbents;
3. the creation of PFCs by the passage of the Omnibus Budget Reconciliation Act of 1990 that allows airports to charge fees and provides airports an independent capital funding source;
4. the ongoing conflict between the need for airport expansions and environmental concerns, particularly noise pollution; and
5. the inability of the FAA and the air traffic control system to keep up with the growing demand.

As Incumbents established Hub and Spokes and spheres of influence around key hubs, government regulators realized hub premiums were charged at

Concentrated Airports. The House (*The state of competition in the airline industry*, 1998), Senate (*Barriers to competition in the airline industry*, 1989), and GAO (1990b, 1993, 1996, 1999a) were critical of Incumbents' practices that maintained hub premiums and kept out competition. Despite DOT's rubberstamp of mergers and alliances that allowed for the industry's rapid consolidation and Incumbents' control of geographic regions, DOJ undertook two major industry lawsuits for antitrust behavior, took over merger approval from DOT, and attempted to broaden the definition of predatory pricing and reputation for predation (i.e., *U.S. v. American et al.* (2000)).

The CRS and its follow-on innovations allowed Incumbents to gain above industry rents in their geographic spheres of influence as well as develop subtle forms of signaling strategic intent (*U.S. v. Airline Tariff Publishing Co. et al.* "U.S. V. Airline tariff publishing co, Alaska Airlines, American airlines, Continental Airlines, Delta air lines, Northwest airlines, trans world airlines, united air lines, and usair," 1992). Mutual forbearance developed among Incumbents including Southwest, where competitors in multi-markets are less likely to exploit competitive advantages in a particular market for fear of retaliation in some or all of their jointly contested markets (Chen et al., 1998, October; Evans & Kessides, 1993, 1994). This can be seen in the tacit cooperation between American and Southwest in Dallas; Incumbents' recognition of the costliness to respond to a Southwest entry into one of their markets; or the non-response by Southwest in its later years to an entry by an Incumbent into one of its markets. Since the 9/11

terrorist attacks and the bankruptcy of five of the ten Majors the government has been more restrained in its antitrust activities.

The two non-government crises that speeded the development, diffusion, and dominance of the Hub and Spoke were bankruptcies and fare wars. Bankruptcies allowed airlines to purchase key airport assets, increase market shares, and merge with financially weak airlines. Fare wars, often instigated by low-cost New Entrants, exacerbated the financial crisis within the industry and the need for Incumbents to deploy assets to protect their revenue streams. The Hub and Spoke was one response.

Institutional Complexity and Change

The George, Chattopadhyay et al. (2006) Framework (GCSB Framework) integrated prospect theory (Kahneman & Tversky, 1979), threat-rigidity hypothesis (Staw et al., 1981), and institutional theory. The matrix, previously

Table 31
Institutional Persistence and Change

	Potential Loss	Potential Gain
Control of Resources	<i>(1) Nonisomorphic response</i>	<i>(2) Isomorphic response</i>
Control of Environment	<i>(3) Isomorphic response</i>	<i>(4) Nonisomorphic response</i>

Note: From "Cognitive Underpinnings of Institutional Persistence and Change," by E. George, P. Chattopadhyay, S. Sitkin, and J. Barden, 2006, *Academy of Management Review*, 31, p. 349.

Table 32
Institutional Persistence and Change: Hub and Spoke 1978 – 1984

	Potential Loss	Potential Gain
Control of Resources	<i>(1) Nonisomorphic response:</i> United restructured the route network and resources to create Hub and Spoke as a strategic response to recession and competition	<i>(2) Isomorphic response (mimetic):</i> Incumbents and some regionals: American, Continental, Texas Air, and TWA; Bandwagon effect: Delta and Northwest
	Radical innovation; empty core solution	Empty core solution
Control of Environment	<i>(3) Isomorphic response (coercive):</i> predatory behavior, litigation, and legislation to constrain Southwest in Dallas area for 36+ years. <i>(Mimetic):</i> Incumbents' low-cost subsidiaries: Continental, Delta, United, and US Airways	<i>(4) Nonisomorphic response:</i> satellite airports used by Southwest when blocked from major airport access
	Empty core solution	Radical innovation; empty core and free market solutions

Note: From "Cognitive Underpinnings of Institutional Persistence and Change," by E. George, P. Chattopadhyay, S. Sitkin, and J. Barden, 2006, *Academy of Management Review*, 31, p. 349.

described in Chapter 3 and depicted again in Table 31, views responses to threats to the resources or environment of a company as either isomorphic¹ or nonisomorphic (DiMaggio & Powell, 1983).

Isomorphic responses are those that are in conformity with the responses of other organizations in the environment while nonisomorphic responses are not in conformity. George, Chattopadhyay et al. (2006) divide crisis responses into a matrix based on whether decision makers perceive the crisis as a potential opportunity to gain or lose resources or control over the environment.

The three post-Deregulation periods (i.e., 1978 – 1984, the rise of the Hub and Spoke; 1985 – 1992, Hub and Spoke consolidations; and 1993 – 2007, rise of the Point-to-Point low-cost New Entrants) are depicted in three matrices (Tables 32 – 34). An analysis of the Hub and Spoke from 1978 – 1984 is shown in Table 32. The Hub and Spoke is a key resource and a radical innovation.

As Cell 1 of Table 32 summarizes, United, led by a Chairman/CEO and five directors from outside the airline industry, despite industry skepticism, a major recession, and a crippling strike, strategically redeployed its airport resources and route network into a Hub and Spoke. Learning from its costly, unsuccessful attempt to build a Southern hub in Atlanta (Aviation Week & Space Technology, 1980j) United chose to select geographic areas and competitors carefully, and to create what would become spheres of influence around hub fortresses. While United's Hub and Spoke strategy eliminated many short-distance trips, including those to its hubs, it created feeder alliances with smaller airlines (Aviation Week & Space Technology, 1980e) to increase its hub densities. This Hub and Spoke follow-on innovation was enhanced by United's CRS and other CRS follow-on innovations such as code-sharing status and

FFPs. The Hub and Spoke allowed United and other Incumbents to block or restrict competitive entry and to achieve above industry rents, an empty core solution. For example, despite the 1990 - 1991 recession when empty cores typically arise, United gained hub premiums at Denver, as did Delta at Atlanta and Cincinnati Airports, and US Airways at Charlotte, Philadelphia, and Pittsburgh Airports (see Chapter 7).

Cell 2 summarizes the isomorphic responses of competitors to United's Hub and Spoke system. American, a close follower, quickly emulated United. In fact, as with the CRS radical innovation, American became more adept than United at using the Hub and Spoke to strategically reorient its resources, create Hub and Spoke defenses, and obtain substantial above industry rents. American developed a strong hub fortress at Dallas Airport (see Chapter 7); increased its slot controls at all four slot-controlled airports (see Appendix H); and created strong secondary hubs at Raleigh and Nashville Airports by buying Nashville Eagle (see Chapter 6). Texas Air grew by merging with two Incumbents, Continental and Eastern, and took advantage of their Hub and Spoke resources and CRS. TWA established a domestic hub at its St. Louis headquarters. Delta, the creator of the Hub and Spoke, and Northwest proceeded cautiously in route expansions despite their financial strength, and only joined the Hub and Spoke bandwagon in 1986. Mimetic Incumbents were able to create regional spheres of influence by reorienting their resources into Hub and Spokes and reducing competitive entry, an empty core solution.

Cell 4 summarizes a nonisomorphic response to a crisis: the use of satellite airports by Southwest when the airline was blocked from operating at most airports by Incumbents. This use was a radical innovation. Southwest was blocked at Love Field Airport, its hub and headquarters, by years of litigation, and from that crisis developed a number of follow-on innovations, including the 10-minute airplane turnaround and flying Point-to-Point. Southwest incorporated the use of satellite airports into its core strategy. This radical innovation allowed Southwest to control its environment by avoiding head-to-head competition with Incumbents, operating out of less congested and costly airports, achieving the highest airplane utilization rates in the industry, creating a flexible work force, and building sufficient resources to become the largest domestic airline. This breakthrough radical innovation clearly illustrates the innovation cycle. This radical innovation allowed New Entrants to compete at underutilized airports, both an empty core and free market solution. It is an empty core solution because satellite airports can become hub fortresses, especially as they become congested and limit future New Entrants. The use of satellite airports is also a free market solution as it opens previously underutilized airspace and airports to competition.

In response to Southwest's entry at Love Field Airport, Braniff and Texas Air's predecessor were indicted for illegally trying to drive Southwest out of business, a coercive isomorphic response, as summarized in Cell 3 of Table 32. Incumbents, cities, communities, and Dallas Airport authorities tried to keep

Southwest from operating at Love Field Airport through litigation and that Federal courts and the FAA ruled as unjustly discriminatory and anticompetitive (City of Dallas v. Southwest Airlines Co. 1973).

Incumbents' coercive isomorphic responses to constrain Southwest at Love Field Airport continue today as Southwest tries to eliminate perimeter controls with proposed legislation while Incumbents persuade Texas Congressional members to withhold support (Associated Press, 2006), an empty core solution. American's coercive isomorphic response, classic predatory behavior, at both Dallas Airports, Love Field and Dallas, is an empty core solution as it restricts New Entrants and increases American's hub premium at Dallas Airport.

Another isomorphic response by Incumbents to Southwest and low-cost New Entrants is to mimic them, as also summarized in Cell 3 of Table 32. While United originally created a short-haul, low fare division in 1982, it and other Incumbents did not execute this mimetic response (e.g., United's Shuttle by United and Ted; Delta's Express and Song; Continental's Lite; and US Airways' MetroJet) until the 1990s as competitive pressure from low-cost New Entrants increased and the recession of 1990 – 1991 caused the industry to lose more than it made since the start of commercial aviation. Low-cost subsidiaries were a response to stakeholders' demands that Incumbents respond to this financial crisis. While American and Northwest are noteworthy as being holdouts to this mimetic response, in the crises of the 9/11 terrorist attacks and the 2001

recession, Northwest told stockholders it was studying the option. While none of the low-cost subsidiaries have been successful to date, it provides Incumbents with control over their environment: a defense against antitrust charges, the ability to respond to stakeholders' criticisms, and a subsidiary to use against New Entrants while maintaining high fares elsewhere on its Hub and Spoke.

Incumbents are less at risk for antitrust allegations of pricing below costs if subsidiaries can be structured separately from the rest of their operations and at lower costs (Forsyth et al., 2005). Incumbents' low-cost subsidiaries are an attempt at vertical integration, an empty core solution.

Table 33 covers the time period between 1985 and 1992, when Incumbents consolidated their control of Hub and Spokes, and market shares and hub premiums rose sharply (see Chapter 6). Cell 1 shows the nonisomorphic response by American after it lost over 25% of its National Airport slots, where it had invested millions of dollars in facilities, both key resources (Aviation Week & Space Technology, 1980k). While some airlines and airport authorities who lost slots or access to National Airport responded in isomorphic ways — Northwest sued in federal courts; Norfolk Airport Authority petitioned CAB — American redeployed its resources to purchase Nashville Eagle, a small regional airline. Renamed American Eagle, this follow-on innovation allowed American to dominate smaller communities, such as Nashville and Raleigh Airports (see Chapter 6). By 1994 American had control of the largest number of regional

Table 33
Institutional Persistence and Change: Hub and Spoke 1985 – 1992

	Potential Loss	Potential Gain
Control of Resources	<i>(1) Nonisomorphic response:</i> American loses slots at National Airport, buys Nashville Eagle, and creates secondary hubs in smaller cities	<i>(2) Isomorphic response (coercive):</i> Incumbents' manipulation of High Density Rules increases slot controls. <i>(Coercive):</i> airport authorities and DOT protective of Incumbents
	Follow-on innovation; empty core solution	Empty core solution
Control of Environment	<i>(3) Isomorphic response (coercive):</i> long term, exclusive use Residual Leases with MII's give Incumbents control over airport environment and ability to block New Entrants	<i>(4) Nonisomorphic response:</i> Some airport authorities, fearful of losing air service, create environment conducive to New Entrants using practices, procedures, leases, and PFCs
	Empty core solution	Free market solution

Note: From "Cognitive Underpinnings of Institutional Persistence and Change," by E. George, P. Chattopadhyay, S. Sitkin, and J. Barden, 2006, *Academy of Management Review*, 31, p. 349.

airlines and used these regional airlines to pressure pilots on productivity and wage issues. In the same time period, Delta purchased minority interests in feeder airlines, Atlantic Southeast and Comair, and used them to control other smaller airports such as Cincinnati Airport (see Chapter 6). Texas Air purchased several regional airlines, which were consolidated into Continental after its bankruptcy. United was constrained from owning regional airlines by its pilots union until 1992. Ownership of regional airlines allowed American to vertically integrate, increase

hub densities, and gain above industry rents at secondary hubs, all empty core solutions.

Cell 2 of Table 33 summarizes the response of Incumbents to the FAA's 1985 revision of the High Density Rule. The loss of slots represents a loss of key resources, including millions of dollars invested in airport real estate, market share in dense urban areas, airplane utilization on more profitable routes that would otherwise be redeployed to less profitable routes, and asset write-offs with little ability to recoup investments. While National Airport was the source of most battles between Incumbents, New Entrants, and the government, slot allocations were critical at JFK, La Guardia, and O'Hare Airports, too. The 1985 High Density Rules revision had the unintended consequences of increasing Incumbents' control of slot-controlled airports (see Appendix H). Slot-controlled airports, except JFK Airport, continued to provide hub premiums through 1998, while hub premiums declined at other Concentrated Airports during the same period (see Chapter 6). Incumbents' ability to maintain control of slot-controlled airports increases market share and hub premiums, and limits competitive entry, an empty core solution.

Cell 2 of Table 33 also addresses the protection of Incumbents by airport authorities. Of all the reasons why it is most difficult to open airports to New Entrants, the self-interest problem is probably the most difficult to excise from airport authorities and regulators' behavior. It is a subtle institutional effect or long-standing pattern of behavior. Deregulation placed airport authorities in a

dilemma between enforcing Deregulation's goal of competitive entry versus their own self interests of ensuring their community's access to viable, convenient commercial air service and fulfilling their own fiscal responsibility. The addition of New Entrants to an airport creates competitive pressures on Incumbents, reduces airline profits, and may cause Incumbents to leave the airport or scale back. Residual Leases, which provide for operating losses to be covered by airlines, can only be paid by a financially strong airline. Financially strong airlines also provide good credit that allows airport authorities to achieve the highest bond ratings for capital projects, reducing debt service costs. Therefore, it is not surprising that airport authorities with a vested financial interest in their Incumbent would do all they could to ensure its success. Self interests propel airport authorities into coercive isomorphic responses. Charlotte Airport most exemplifies the symbiotic relationship between its Incumbent, US Airways, and airport authorities. Charlotte Airport authorities expressed strong allegiance to US Airways for making it a significant hub within its network, providing it with the benefits of a large-single-carrier connecting hub, additional air service, and other economic benefits (US FAA/OST, 1999a). Airport authorities described their relationship with US Airways as "partner." The cost of this partnership may be high hub premiums. Charlotte Airport had one of the highest hub premiums in the country (see Chapter 6). This pattern can also be seen at Cincinnati, Dallas, Detroit, La Guardia, Minneapolis, and Newark Airports. New Entrants at these airports reported the following behaviors on the part of airport authorities:

difficulties obtaining space; no limitation on sublease charges; lack of cooperation to identify excess space; failure to aid in sublease negotiations; long delays; refusal to grant signatory status; PFC funds used for exterior projects that do not expand airport space for New Entrants; and preference for long-term leases to ensure financial stability and repayment of capital debt. As discussed in previous chapters and Appendix H, all of these airports had high hub premiums.

Airport authorities see themselves in competition with other airports for Incumbents and New Entrants. The authorities at smaller airports fear loss of airline service, despite government subsidies under EASP for some small cities and isolated towns. As Paul G. Caplan, Norfolk Port and Industrial Authority Commission Chairman said, "The problem comes ... when your community looks good on Monday, but two weeks later, somewhere else looks better. There is real difficulty in getting the carriers to make a commitment ... due to the fluidity and erratic nature of deregulation" (Ott, 1979b, p. 25). Some airport authorities perceive PFCs as a tax that passengers object to and that may harm their competitive position relative to other airports in the area (US FAA/OST, 1999a). Some airport officials take a neutral approach towards New Entrants due to a reluctance and/or lack of knowledge of their legal obligations to assist them. The environment for Incumbents' commitments to airports has worsened under Deregulation as the industry has undergone waves of bankruptcies and mergers. After each wave of mergers or bankruptcies airport authorities try to retain Incumbents as tenants to ensure the on-going viability of commercial air service

to their communities, the ability to fund capital projects, pay for operating costs, and jobs.

“Airports were once the most stable institutions in the aviation industry,” said Raymond G. Glumack, Executive Director of the Minneapolis-St. Paul Airports Commission. After Deregulation “... all is chaos,” Mr. Glumack added (Aviation Week & Space Technology, 1980f, p. 55). Airport authorities were put in charge of deciding which airline would control a key resource in the deregulated environment: airport access in the form of slots, gates, leases, and other real estate. Airport access replaced CAB route awards as the key resource that determined airlines’ viability. Airport authorities had little or no guidance from government officials:

... airport operators... are carefully watching maneuvers by government agencies that are themselves uncertain how to handle deregulation... Airport operators believe federal controls over airports, greater than anyone in government now cares to admit, are inevitable as traffic grows and environmental constraints increase, tightening the squeeze on airport gates, counter space and slots (Ott, 1979b, p. 24).

At worse, airport authorities faced threats of loss of federal funds and public denouncements from government officials as was seen at several California airports (e.g., Burbank, Long Beach, San Diego, and San Francisco Airports). It is hard to imagine the difficulties faced in those early years by public servants who were risk adverse and financially conservative, in a radically changed environment with multiple, conflicting crises: New Entrants, Incumbents, environmentalists, community activists, federal regulators, abandonment of long-held routes, loss of the DC-10 which left some cities without service, fuel

shortages, and the PATCO strike. It is thus not surprising that airport authorities made significant efforts to retain and accommodate Incumbents to maintain commercial air service to their communities, their mission.

Lastly, Cell 2 of Table 33 addresses the protection of Incumbents by DOT at the federal level. As this thesis shows, local, state, or federal regulators are not immune to the need to protect their regulated industry and its members. DOT's authority to remove slot controls or raise the number of slots to the highest practicable levels at JFK, La Guardia, and O'Hare Airports was mandated under the Federal Aviation Reauthorization Act of 1994. While DOT was to consider issues of congestion, noise, safety, environment, Stage III airplanes, financial viability of routes, and low-fare competition (US DOT, 1998), the GAO found that DOT protected Incumbents. DOT "... concluded that eliminating the slots would not be in the public interest because the project benefits to consumers would be outweighed by the negative impacts on the incumbent airlines in terms of flight delays and reduced profits..." (US GAO, 1996, p. 8). DOT interpreted narrowly the "exception circumstance" criterion which could provide New Entrants with slots and rejected applicants that proposed nonstop service already provided by an Incumbent. DOT stated, "... it is clear from the legislative background that the lack of nonstop service in larger markets was clearly on the minds of several supporters" (US GAO, 1996, p. 9). GAO disagreed with DOT's interpretation saying, "In our review of the legislative history ... we found no congressional guidance on the interpretation of the exception circumstance criterion" (US GAO,

1996, p. 9). Incumbents, aided by DOT, thwarted the Federal Aviation Reauthorization Act of 1994 to increase slots for New Entrants by providing nonstop service. DOT, like airport authorities, felt protective of Incumbents and either overtly or through inertia aided Incumbents by reducing competitive entry. This coercive isomorphic response to new laws reflects the central thesis of Stigler (1971, p. 3), "... that, as a rule, regulation is acquired by the industry and is designed and operated primarily for its benefit." The state can provide the power to coerce, which the industry uses to increase its profitability (Stigler, 1971). Stigler (1971) said one way to increase profitability is to control entry by rivals, an empty core solution.

Cell 3 of Table 33 is Incumbents' coercive isomorphic responses to New Entrants' threats at key airports. Incumbents control airport entry through long-term, exclusive use, Residual Leases with MII clauses. Airport authorities and bond markets seek long-term Residual Leases to ensure payment of all operating expense shortfalls and bond debt. In return, airlines seek exclusive use of airport space they improve at substantial capital dollars, lower fees, long lease terms with options to renew to ensure a reasonable return on investment and depreciation period, and the ability to veto or change any capital projects that increase debt obligations. Leases are long-term legal obligations and rights carried over from the pre-Deregulation era and continue today. Airport authorities' efforts to change to less restrictive leases are met with Incumbents' resistance. Airport officials told the GAO, "... airlines are ... refusing to sign new

leases with less restrictive terms and even ... going to court to try and force long-term agreements and majority-in-interest agreements which give airlines some control over expansion decisions” (US GAO, 1990b, p. 41). Prior to Deregulation there was no expectation that Incumbents would share their capital improvements with competitors, or worse, pay for their competitors’ space through debt repayment as required in their Residual Leases. Therefore, it is no surprise that Incumbents veto New Entrants’ projects to protect their interests. GAO (1990b) reported that over 59% of large and medium-sized airports had MIIIs and 79% of Concentrated Airports had MIIIs. Using MIIIs to block New Entrants, Incumbents achieved a 3% hub premium (US GAO, 1990c). Long-term leases and standard operating procedures and practices between airport authorities and Incumbents allow Incumbents to create barriers to entry, achieve above industry rents, and to control their environment, all empty core solutions.

Some of the ways Incumbents retain their control over airport authorities, airport projects, and block competitive entry to maintain hub premiums are:

1. Incumbents cooperate and coordinate MII approval at one airport for support of a project at a different airport (i.e., mutual forbearance).
2. Sometimes just an Incumbent’s threat to block a project is sufficient to stop or delay New Entrants. Delays are just as effective at stopping a New Entrant as an MII veto as airport projects with extensive environmental concerns take years to plan and construct and New Entrants cannot wait years.

3. Where Incumbents are pressured to provide space for New Entrants only short-term subleases are offered (see Chapter 9) with Incumbents holding the ability to cancel the subleases on short notice; high rents are charged; ground services are tied to subleases; and sometimes an Incumbent's employees are used to service the New Entrant's airplanes, despite being of a different union or a non-union shop and in spite of antitrust laws.
4. Airport authorities try and plan for growth while Incumbents are only willing to fund those projects that address current requirements or when their operations are actually overcrowded (US GAO, 1990b) given the financial constraints of the industry, the constant prospects of bankruptcy and recession, the need to repair balance sheets, and the need to invest in new airplanes (Bailey, 2006d, 2007a).
5. While PFCs are meant to provide a stable, alternative source of capital funds independent of Incumbents' pressure, in fact, Incumbents continue to control airport expansion projects regardless of funding source. Most PFC-backed projects benefit Incumbents (US FAA/OST, 1999a). Incumbents predicate their approval for MII projects on PFC project approval; demand airport authorities not charge PFCs or expand their airport to accommodate New Entrants; and use follow-on innovations such as TACOs, and signaling to maintain control over a key airports and drive out New Entrants (see Section 2).

In addition to Incumbents' efforts to prevent competitive entry and build hub fortresses described above, New Entrants are reluctant to enter markets or cut prices where an Incumbent has a large market share, can retaliate with fare cuts in other markets it shares with the Incumbent (Senate Committee *Aviation competition: Challenges in enhancing competition in dominated markets*, 2001), and has deep pockets. This reluctance to compete directly with Incumbents was seen in Southwest's early efforts to seek satellite airports, as well as by other New Entrants such as Legend Airlines and Access Air. If airport authorities are unable to obtain funding to expand airports independent of Incumbents or obtain sufficient federal funds, which have been constrained for decades, then airport authorities cannot provide access to New Entrants or accommodate Incumbents' growth. Constrained airports limit the national airspace's ability to accommodate growth and continue to maintain airport access as a key resource. These coercive isomorphic responses by Incumbents to control their airport environments are empty core solutions that block New Entrants and provide above industry rents.

Cell 4 of Table 33 is nonisomorphic responses by some airport authorities to create an environment conducive to New Entrants. Fearful of a potential loss of air service many smaller airports such as Baltimore and Norfolk Airports promoted airline services; provided financial incentives to New Entrants (Ott, 1979b); changed practices, procedures, and leases; and took advantage of PFCs to build space for New Entrants. Three airports that best exemplify this

nonisomorphic response are two formerly Concentrated Airports, Salt Lake and Atlanta Airports, and one unconcentrated airport, Baltimore Airport.

First of all, at Salt Lake Airport, authority practices aided New Entrants, as reported by Russell C. Widmar, Executive Director of the Salt Lake City Airport Authority: airport authorities retain control of several gates and some ticket counter space that is available to New Entrants at reasonable terms and prices; regulate sublease prices; and retain the right to reject subleases if prices are unreasonable (US FAA/OST, 1999a). Salt Lake Airport has 49 exclusive use gates, 20 preferential shared use gates, and 3 airport controlled gates (see Appendix G).

At Atlanta Airport, Delta has been the undisputed leader, purchasing gates from weak and bankrupt competitors and maintaining long-term leases with MII rights. This forced airport authorities to use discretionary funds not linked to an MII clause to refurbish former Eastern space in 1999 for AirTran, successor to ValuJet. This allowed airport authorities to control 46 airport controlled gates versus Incumbents' 125 exclusive use gates (see Appendix G). Besides the gates under their control, airport authorities review and limit sublease charges to New Entrants and ensure that ground services are competitive. Longer term, airport authorities were deciding whether to impose a moratorium on long-term exclusive use gates and ticket counters, to convert some airport space to common use, and increase utilization of space by all airlines (US FAA/OST, 1999a). Atlanta Airport, however, is the busiest airport in the nation and has

significant airspace, airfield, and terminal congestion with no relief in sight (US FAA/OST, 1999a).

Lastly, Baltimore Airport is overshadowed by its adjacent airport neighbors, perimeter- and slot-controlled National Airport and Dulles Airport. As a smaller airport, it actively promoted itself in 1979 and quickly became home to eight New Entrants, eventually luring Southwest. Airport authorities' practices include a limit on sublease costs; PFCs used to build 22 gates to accommodate low-cost New Entrants; gate utilization monitoring; preferential-use leases that give Incumbents right of first use but allow use of the space by other airlines when not needed by Incumbents; and airport control of several gates.

The nonisomorphic response by some airport authorities to the new environment was to change standard airport practices, procedures, leases, and the use of PFCs to develop an environment more conducive to New Entrants. Some of the airport authorities were able to take advantage of strategic moves by Incumbents to provide space or opportunity to add New Entrants. However, for Baltimore Airport, it was done by radically amending its practices, procedures, leases, and use of funding at the dawn of Deregulation. These nonisomorphic responses by airport authorities to control their environment are a free market solution because it allowed underutilized airports, such as Baltimore Airport, to be fully utilized by New Entrants, and Atlanta and Salt Lake Airports to take advantage of a merger or bankruptcy to maximize usage of their facilities. New

Entrants provide these airport authorities with a diverse and competitive mix of airlines that reduce hub premiums.

Table 34 covers the time period between 1993 and 2007, when Incumbents significantly expanded overseas, led by United's international alliances, and Southwest expanded into territory formerly held by Incumbents to

Table 34
Institutional Persistence and Change: Hub and Spoke 1993 – 2007

	Potential Loss	Potential Gain
Control of Resources	<i>(1) Nonisomorphic response:</i> United creates international alliance that allows for virtual end-to-end mergers	<i>(2) Isomorphic response (mimetic):</i> Potential to gain resources and thwart competitive threat, American mimics alliance. Bandwagon: Continental, Delta, and Northwest
	Follow-on innovation; empty core and free market solutions	Empty core solution and free market solutions
Control of Environment	<i>(3) Isomorphic response (coercive):</i> predation, price leadership, détente, mutual forbearance, spheres of influence, and requests for government intervention	<i>(4) Nonisomorphic response:</i> Southwest's entry into Incumbents' spheres of influence
	Follow-on innovations; empty core solution	Free market solution

Note: From "Cognitive Underpinnings of Institutional Persistence and Change," by E. George, P. Chattopadhyay, S. Sitkin, and J. Barden, 2006, *Academy of Management Review*, 31, p. 349.

become the largest domestic airline. This period was impacted by two recessions (1990 – 1991 and 2001), Gulf War I and II, the 9/11 terrorist attacks, and high fuel prices. The 1990 – 1991 recession wiped out all the cumulative profits since the industry's inception. The combination of the 9/11 terrorist attacks, the 2001 recession, and Gulf War II led to the largest financial losses ever for the industry, \$40.4 billion with government subsidies and pension relief, and the bankruptcy or near bankruptcy of most Majors (see Chapter 3).

Cell 1 shows the nonisomorphic response to a crisis by United in its creation of international alliances that now span the world. While American and other Incumbents used their resources to buy regional airlines, United was prohibited from doing so by its pilots union until 1992. Without the ability to provide feed from owned regional airlines, United was forced to look abroad. It is noteworthy that United did not participate in the wave of mergers in the 1980s (see Appendix E) except to purchase Pan Am's Pacific routes in 1985. United also did not enjoy significant hub premiums at its Denver Airport hub (see Chapter 7) although it had hub premiums at slot-controlled O'Hare Airport (see Appendix H). During the early to mid-1980s, United's strategic goal was to diversify into travel-related industries such as hotels and rental cars. It was only in 1987, after pressure from its pilots and shareholders, that United jettisoned its diversification strategy and returned to its core airline business (United Airlines, 1988). United's domestic constraints led to a Hub and Spoke follow-on innovation of international alliances, and is in conformity with Raider's (1998) findings.

Forced by its pilots and shareholders to focus on its core airline business, United sold its CRS to a consortium of foreign and domestic airlines, gained knowledge and skills from its Pacific routes and feeder airline alliances, and created the first international alliance, Star Alliance, which has 16 partners including US Airways (United Airlines, 2007). This Hub and Spoke follow-on innovation allows United to achieve the largest market share of global industry capacity, acquire strong international partners, increase its market reach at relatively low costs and risks, build upon its CRS innovations, reduce regulatory scrutiny, increase Hub and Spoke densities, increase revenues, exploit a lucrative niche, and improve passenger services. Star Alliance's corporate business has doubled its revenue in the last five years to 2.2 billion Euros (about \$3.3 billion) (Kaufman, 2007). The alliance is both an empty core and free market solution. It is an empty core solution as the alliance represents vertical integration. It is a free market solution as the alliance allows airlines to open international markets in spite of restrictive bi-lateral agreements and airport restrictions and create a world wide market.

Cell 2 of Table 34 is Incumbents' isomorphic response to United's Star Alliance. American quickly mimicked United with oneworld, which has seven airline partners. In 2004, oneworld had a 15% market share of global industry capacity (Standard & Poor's, 2005). American and British Airways sought a comprehensive alliance with antitrust immunity from 1996 to 2002, but failed to obtain regulatory approval. In fact, as mentioned previously, antitrust restrictions

plague American and British Airways. American and British Airways will attempt for a third time to obtain regulatory approval for a comprehensive alliance with antitrust immunity with the advent of the Open Skies agreement in 2008. Delta formed the SkyTeam alliance, several members of which later either entered bankruptcy or left the alliance. Continental, Northwest, and KLM created Wings. However, Wings lost its only strong European member when KLM merged with Air France, and ultimately Continental and Northwest were forced to join Delta's SkyTeam. Currently, Delta's SkyTeam has thirteen airlines (Delta Air Lines, 2007). In 2004, SkyTeam had a 19% market share of global industry capacity (Kaufman, 2007; Standard & Poor's, 2005). American again was a close follower of United's follow-on innovation, as it was of United's radical innovations, CRS and Hub and Spoke. However, unlike other innovations, United maintains its first mover advantages (M. B. Lieberman & Montgomery, 1988) in international alliances while American became bogged down in antitrust and regulatory issues with British Airways. Delta, Continental, and Northwest joined the international alliance bandwagon late (Aldrich & Fiol, 1994), and as with CRS innovations, had difficulties in execution. SkyTeam and oneworld are also following Star Alliance's co-location strategy. oneworld co-located hubs at Tokyo and Madrid and SkyTeam at Seoul and Paris (Kaufman, 2007). Creation of mimetic international alliances were an isomorphic response to United's Star Alliance, and are both empty core and free market solutions. International alliances create vertical

integration and open markets that are otherwise restricted by bi-lateral agreements and airport restrictions.

Cell 3 of Table 34 summarizes isomorphic responses by Incumbents to control the airport environment and protect hub premiums. By dividing the country geographically into Hubs and Spokes, Incumbents established spheres of influence in which they achieved above industry rents. Aviation Week and Space Technology (1980k, p. 71) noted, "Carriers are developing spheres of influence centered in their hub systems, and they are seeking to strengthen their positions in order to meet any challenges that could come from other carriers." American's president, Robert Crandall, warned Congress of these spheres of influence saying, "... the issue before the Subcommittee [should be] whether carriers with far greater regional market shares ... should be allowed to drive all competing CRSs out of their areas of domination... The major phenomenon of deregulation is not CRS, but the development of hub and spoke systems" (House Subcommittee *Airline computer reservation systems*, 1988, pp. 141-142). Catalysts for the diffusion and dominance of spheres of influence were bankruptcies, mergers, feeder airline alliances, CRS innovations, and a lenient DOT. As Standard & Poor's analyst, S. Klein, said, "The DOT originally promoted the hub system and blocked regional competition by rubber stamping code-sharing agreements" (Standard & Poor's, 1999b, p. 10). Incumbents became increasingly sophisticated in signaling intent and strengthening their spheres of influence, as reported by Standard & Poor's analyst, T. Canning,

The battle to dominate hub airports, however, has given way to détente. Carriers now respect the hegemony each enjoys at three to four hubs. This cozy peace has improved load factors, stabilized airfares, and contributed to the industry's ... [largest] profit margins in decades (Standard & Poor's, 1998, p. 10).

Incumbents achieved détente by using CRS and its follow-on innovations, and by tacit cooperation and coordination. As reported by *Wall Street Journal* reporter Asra Q. Nomani (1990), and described in a previous chapter, Incumbents developed methods to control their spheres of influence.

Evans and Kessides (1993, pp. 464-465), in what they called the "Golden Rule" or mutual forbearance, found "firms that meet as competitors in many markets may be less likely to exploit their competitive advantage in any particular market for fear of retaliation in some or all of their jointly contested markets." Multi-market contact can potentially strengthen oligopolistic coordination within specific markets (Chen et al., 1998, October; Evans & Kessides, 1994) with fares higher in routes served by airlines with extensive inter-route contacts (Evans & Kessides, 1993). If Incumbents are able to control spheres of influence around key hubs by "trashing," "bombing," signaling, and mutual forbearance, they are able to solve their empty core problem. Incumbents are able to achieve above industry rents in strong hubs which allows them to cover the costs of expensive Hub and Spokes. Cross-subsidies from profitable routes cover for less profitable routes such that entire the Hub and Spoke is profitable. This cross-subsidization is similar to CAB's cross-subsidization program of short, lightly traveled routes with more profitable, longer, densely traveled routes (US GAO, 1990a), but reversed. That is to say, the current Hub and Spoke for most Incumbents cross

subsidizes less profitable or barely profitable longer, densely traveled routes with more profitable short, local, lightly traveled routes.

American's efforts to provide fare leadership and discipline began in the early 1980s when the airline tried to lead the industry with "fare simplification" and "value pricing," based on a more "rational" four-tier fare structure. American's CEO, Robert Crandall, abandoned the effort after numerous lawsuits and antitrust attention by regulators. By aggressively protecting its markets and driving competition out of its spheres of influence, American was alleged by DOJ to develop a reputation for predation (U.S. v. American et al. (2000)).

The government's efforts, either by legislation or by antitrust litigation, to eliminate hub barriers that Incumbents created, are an example of competitors' coercive response to a hostile environment. Small airlines and their trade association lobbied for government intervention. Ed Faberman, Executive Director of Air Carrier Association of America, a trade group of New Entrants, said of the lawsuit against American:

I think the Justice Department ultimately looked at this industry and concluded there are fewer competitors than before, this behavior has to stop and that they had to send a message. It's a very important message sent not only to the large carriers, but the industry (Labaton, 2001, p. C10).

Lobbying efforts by New Entrants included the proposed legislation, "Enforcement Policy Regarding Unfair Exclusionary Conduct in the Air Transportation Industry." As DOT's general counsel, Nancy E. McFadden, testified before the House Committee on the Judiciary,

... the Department has received an increasing number of complaints by smaller airlines that the largest airlines are using unfair tactics to keep them from getting a foothold ... at hub airports... we have shaped a policy that targets only the most egregious conduct... We have no intention of reregulating the airline industry, as some have charged... (House Committee *The state of competition in the airline industry*, 1998, pp. 7-9).

Thus, we see in Cell 3 of Table 34, coercive isomorphic responses to control the environment by both Incumbents and New Entrants. Spheres of influence and mutual forbearance are empty core solutions as they allow Incumbents to tacitly cooperate and gain above industry rents. American's efforts to provide fare leadership were a response to a chaotic fare environment that often led to fare wars, characteristic of the post-Deregulation era, and was an empty core solution. Further, American's strategy to aggressively protect its hubs from New Entrants is was another example of an empty core solution. The government's response of antitrust litigation and proposed legislation, at the behest of New Entrants, was an isomorphic, coercive response to radical and follow-on innovations.

Cell 4 of Table 34 is Southwest's nonisomorphic response to Incumbents' spheres of influence. Southwest's initial strategy was to center its business in satellite airports (Southwest Airlines, 1978) and, after its experience against Northwest at Detroit and Minneapolis Airports, not to enter any gate constrained airport (US FAA/OST, 1999a; US GAO, 1996). These strategies allowed Southwest to avoid head-to-head competition with Incumbents on large parts of its networks (Knorr & Arndt, 2005) and to build significant resources. Instead of maintaining a *détente*, as other Incumbents did with respect to spheres of

influence, Southwest began to enter key airports after it accumulated sufficient key resources, caused Incumbents to retreat to international routes, and became the largest domestic airline.

Southwest was forced to use satellite airports as it was blocked by Incumbents from large and medium-sized airports (Cell 4, Table 32). At a number of locations, Southwest learned co-existence, abandonment, and vigorous competition. For example, Southwest and American are both headquartered in Dallas. "American had long pursued a strategy of co-existence with Southwest ... focusing on flow traffic (i.e., ... medium to long-haul) ... and premium passengers and leaving short-haul ... to Southwest" (Knorr & Arndt, 2005, p. 162).

As Southwest grew in resources most Incumbents avoided direct competition: "Southwest ... has not been subject to ... predation... incumbents' recent restraint ... is ... due to their experience gained from attacking Southwest... Southwest starts new service with high frequent service, making it very expensive for incumbents to 'bracket' ... Southwest's flights" (Knorr & Arndt, 2005, p. 165). In typical competitive battles between Incumbents and New Entrants, Incumbents 'bracket' flights around a New Entrant's flights with matching low fares but maintain higher fares at other times. Other times, Incumbents flood the same routes of New Entrants with many flights. However, Southwest operated differently from other New Entrants, making it financially impossible for Incumbents to respond to Southwest's entry in the same fashion. Oster and Strong (2001) also did not find any aggressive response to

Southwest's moves nor by Southwest to competitors' moves. Southwest could also retaliate against Incumbents as it gained a larger national presence and significant financial resources. Evans and Kessides (1993, pp. 464-465) found "firms that meet as competitors in many markets may be less likely to exploit their competitive advantage in any particular market for fear of retaliation in some or all of their jointly contested markets." While multi-market contact can potentially strengthen oligopolistic coordination within specific markets (Chen et al., 1998, October; Evans & Kessides, 1994), this did not work with Southwest because Southwest did not move in tacit coordination with other Incumbents. In fact, Southwest has often been the outsider of many Incumbents' joint efforts to increase control over resources and the environment. For example, in *U.S. v. Airline Tariff Publishing Co. et al.* (1992) Southwest was not a member of the parties because it lacked a CRS and did not try to maintain hub premiums at its airports. Thus, there was no love lost between the competitors.

However, there was awareness by all Incumbents of Southwest as a worthy competitor. By 1991, Southwest began to exert its influence on prices in the short-distance markets (US DOT, 1993). In 1993 "when Southwest decided to enter California, American immediately scaled down its local short-haul operations to avoid a direct confrontation" (Knorr & Arndt, 2005, p. 162). The District Court recognized New Entrants' fear of Southwest's vigorous competition that they sought to avoid (*U.S. v. American et al.* "U.S. V. Amr corp. Et al," 2000). Clifford Winston (Bailey, 2006b) found in 2000 that consumers continued to

benefit from Southwest's presence in the amount of \$19.6 billion in savings (see Chapter 7). As Southwest declined to recognize Incumbents' spheres of influence, moved to long-distance travel, and increased competitive pressures on Incumbents, Incumbents either abandoned or scaled back in markets that Southwest entered. Southwest became the dominant player in 93 of its 100 top markets (US DOT, 1993). Incumbents' mimetic behavior of creating low-cost subsidiaries has failed, with all low-cost subsidiaries terminated (Cell 3, Table 32). Southwest and Incumbents' responses to each others entry into their respective markets now seems to be mild in comparison to responses to New Entrants (Oster & Strong, 2001). Southwest, in contrast, has vigorously responded to entry by Virgin America in 2007, a typical Incumbent reaction to a New Entrant. Perhaps the most significant response by Incumbents' to Southwest's entry into their domestic markets is the move to more lucrative international routes.

Southwest's nonisomorphic response to Incumbents' attempt to maintain and cooperate around spheres of influence was to attack them. Southwest's strategy of remaining at satellite airports was no longer viable because there are fewer satellite airports, it needed to expand, and it now had the knowledge, experience, and resources to confront Incumbents in head-to-head competition. Southwest's nonisomorphic response is a free market solution as it increases competition in previously controlled spheres of influence.

Vertical integration (Cell 1, Table 33) allows a company to acquire more resources as American found. However, despite the many efforts of United and other Incumbents, vertical integration (Cell 3, Table 32) with a low-cost subsidiary did not succeed in increasing resources. It did provide an antitrust foil for the company. Alliances (Cell 1, Table 34) allow players to coordinate their activities, reduce competition, reduce costs, and increase revenues. Incumbents were able to manipulate rules, regulators, and/or legislation to maintain their Hub controls, despite calls for government intervention (Cell 3, Table 32; Cells 2 and 3, Table 33). Other empty core solutions that were utilized are the two radical innovations (Cells 1 and 4, Table 32), the Hub and Spoke and the satellite airports, though satellite airports also represent a free market solution by opening up the market to smaller airports. Follow-on innovations (Cell 1, Table 33; Cells 1 and 3, Table 34) also represent free market solutions as do international alliances that circumvent restrictive bi-lateral country agreements. It is again notable that United created the initial radical innovation and Southwest the second radical innovation when they were blocked at Incumbents' hubs (Cells 1 and 4, Table 32). Similarly, American proved to be an adept close follower and was instrumental in creating several important follow-on innovations (Cell 1, Table 33; Cell 3, Table 34) that maintained the dominance of the Hub and Spoke.

Tables 32 - 34 provide an analysis of three periods of the Hub and Spokes' development, diffusion, dominance, and displacement. The perspectives of United and Southwest's management teams were not committed to the

actions, practices (Mezias, 1990; S. B. Sitkin & Sutcliffe, 1991; Zilber, 2002), structures (Fligstein, 1985), understandings, and methods that were typical for the industry. The industry's equilibrium was upset by United's Hub and Spoke strategy during a time of crises and great uncertainty. The industry, though doubtful of United's strategy, nevertheless mimicked United's strategy (Cell 2, Tables 32 and 34). Competitors, including American, used primarily isomorphic responses to gain or defend key airport real estate, including slots (Cell 3, Table 32; Cell 2 and 3, Table 33; and Cell 2 and 3, Table 34). Nonisomorphic responses (Cell 3, Tables 33 and 34) are efforts by atypical players, such as maverick airport authorities and Southwest, to gain control over their airport environment. Tables 32 - 34 also clearly depict the innovation – regulation cycle and pleas for regulatory intervention. The radical innovation produces above industry rents for the innovator, which leads to a competitive crisis for other players in the industry. Competitors respond by:

- d. initiating innovative responses, often mimetic (Cell 2, Table 32); or
- e. responding with a radical innovation (Cell 4, Table 32); or
- f. supporting regulatory innovation (Cell 3, Table 32).

Airlines sought control of their environment by requesting government intervention (Cell 3, Table 32; Cell 2, Table 33; and Cell 3, Table 34), a typical isomorphic response of the airline industry which continues today with the use of courts and requests for legislation. American and United created new templates for the industry (Cell 1, Tables 33 - 34) by the use of Hub and Spoke follow-on

innovations (alliances, owning feeder airlines) and attempts to push the envelope on the antitrust debate (cell 3, Table 34). The migration of nonisomorphic responses to new industry templates to deal with changed environments are depicted in Cell 1, Table 32, which created the Hub and Spoke as a radical innovation from an operations solution, resulting in Cell 4 of Tables 32 - 34. Speed of adoption of nonisomorphic templates depended on how great a threat other players perceived a radical innovation. American (Cell 2, Table 32) responded to United that same year by creating a hub at Dallas Airport, while Delta and Northwest took more than six years to acquire hubs via merger. Southwest's satellite innovation (Cell 1, Table 32) still is not the industry standard, but is used extensively by New Entrants and the recent surge of business aviation (Sharkey, 2008b).

Finally, is there any relationship between the GCSB Framework and whether it produces a radical innovation, a free market solution, or an empty core solution? Based on the limited data presented in Tables 32 to 34, an innovator's potential loss of control over resources appears to lead to a radical innovation (Cell 1, Table 32). When United was faced with the potential loss of revenue resources due to competition and the cyclical nature of the industry, they executed a nonisomorphic response that led to a radical innovation. When American lost over 25% of its slots at National Airport (Cell 1, Table 33), it was forced to seek an alternative source of revenues at secondary hubs (Nashville and Raleigh Airports) by buying a regional airline. In contrast to the Incumbents,

Southwest had to find an environment in which it could successfully operate (Cell 4, Table 32). The large and medium-sized airports were already full. Due to the difficult start-up at Love Field Airport and everywhere Southwest tried to gain access, it found itself forced into satellite airports as the only way to survive. Cells 1 to 3 of the GCSB Framework lead to empty core solutions, though Cells 1 and 2 of Table 34 provide weaker evidence as they are both empty core and free market solutions. Cell 4 of the GCSB Framework also provides a mixed response: either both an empty core and free market solution (Cell 4, Table 32) or solely a free market solution (Cell 4, Tables 33 and 34).

From a free market perspective, the potential to gain either resources or control of the environment appear to lead to free market solutions, though primarily Cell 4 in all three Tables, which is where there is a nonisomorphic potential to gain control of the environment. It is also notable that the early years, 1978 – 1992, primarily produced empty core solutions, and not until the period 1993 – 2007, have free market solutions become more prevalent in the other cells as shared solutions with the empty core solution (Cells 1, 2, and 4, Table 34). The free market supports the entry into new markets such as satellite airports and Incumbents' spheres of influence (Cell 4, Tables 32 and 33) and airport authorities' efforts to open their airports to a broader array of airlines (Cell 4, Table 33). The free market also supports entry into previously closed international markets, which was led by United and quickly mimicked by other Incumbents (Cells 1 and 2 of Table 34).

In contrast, the empty core theory says that the airline industry is unable to reach equilibrium between costs and revenues because of high fixed costs, and an inability to decrease production during periods of low demand and make a profit or cover costs. Solutions to the empty core problem include radical innovations that allow airlines to achieve above industry rents to cover losses during recessions (Cell 1, Table 32); vertical integration that allows airlines to earn additional revenues and increase hub densities that reduce average costs (Cell 1, Table 33); government intervention, particularly those that support hub premiums (Cell 3, Table 32; Cells 2 and 3, Table 33); and alliances that encourage cooperation among industry players to reduce cost and increase revenues (Cells 1 – 3, Table 34).

A comparison of the findings between the CRS and Hub and Spoke will be made in Chapter 11. However, it is fair to say that the CRS as a technical innovation had fewer government restrictions in comparison to the Hub and Spoke strategy innovation. These restrictions and the complexity of the restrictions leave industry players with fewer options as the number of passengers dramatically increase and the supply of airports remains relatively fixed.

Strategy Issues

We have discussed and analyzed the Hub and Spoke as a key resource (Barney, 1991; Penrose, 1959; Wernerfelt, 1984) which provided Incumbents with above industry rents, follow-on innovations, and the ability to block New

Entrants such that it posed a significant competitive barrier. GAO concluded that despite the FAA's efforts, "Not a single new passenger carrier was able to establish service at a slot controlled airport via purchasing slots" (US GAO, 1990a, p. 26). Further, Incumbents leased slots for increasingly shorter periods or with very short cancellation notices (see Chapter 9), such that it was uneconomic for New Entrants to start viable service at such airports. It, however, should be noted that JetBlue, a recent New Entrant, started a hub at JFK Airport and that hub premiums at JFK Airport are the lowest of all slot-controlled airports. Increased congestion at JFK Airport and neighboring Newark Airport, may increase hub premiums as slots become increasingly rare, valuable, hard to imitate, and with no close substitutes.

The Hub and Spoke maintained its dominant form for several decades as a significant competitive barrier with above industry rents, confirming it as a sustainable competitive advantage. Despite the rise of the satellite airport and Point-to-Point service, the perimeter- and slot-controlled airports remain sustainable competitive advantages, with their locations (except for Love Field Airport) in dense urban areas with little opportunity to expand.

Crisis and Innovation

Radical innovations are the most critical innovations because they change the technological trajectory and are designed for new or emergent customers, provide the innovator with above industry rents, and provide follow-on innovations with benefits in the future. If the innovator manages the radical

innovation as a key resource and prevents or delays its diffusion in the industry, the innovator can build substantial barriers to entry.

A proposition of this thesis is that crisis provokes innovation. As Raider (1998) found, innovation is greater among companies when the competitive environment is most severe, as for example in the uncertainty following the Deregulation of the airline industry. United sought a competitive advantage in the post-Deregulation environment by riding itself of an archaic route structure and connecting to stronghold markets, avoiding strong competition, and eliminating unprofitable short-distance routes. This strategy, United believed, despite the industry's skepticism, would help it better weather the business cycle and manage its high fuel costs. Companies that face strong, oligopolistic buyers and suppliers have higher rates of innovation and R&D investment, as exemplified by Southwest in its constrained access to airports that threatened its ability to survive. Raider (1998) also found that constrained industries use R&D to break out of constrained positions to increase market share, open new markets, and improve quality or increase profit margins, as American and United did from their Hub and Spoke and follow-on innovations to create new markets not only in the airline industry but in the larger business community and, of course, to go on to earn above industry rents. Finally, Raider (1998) found membership in large networks constrain innovation, as was the case in the Incumbents' mutual forbearance or *détente* that allowed them to maintain spheres of influence around key hubs and maintain above industry rents. This *détente* did not prepare

Incumbents with alternatives once Southwest began its next attack against Incumbents' hubs, and US Airways' second bankruptcy and subsequent merger with America West was hastened by Southwest's move into US Airways hubs at Philadelphia International Airport and Pittsburgh Airport. Raider's (1998) findings are confirmed by this analysis.

While United created this radical innovation, it is again noteworthy that it did not benefit from it as much as American and other Incumbents. United was led by an outsider management team who made strategy decisions that were nonisomorphic responses to the industry's problems. American, as with the CRS, was a close follower of United's Hub and Spoke strategy, and spent substantial resources to maintain its hub premiums, including a number of follow-on innovations such as the purchase of feeder airlines. American prided itself as an industry leader, especially trying to provide price leadership (see Chapter 9). American's management felt very early on that price stability was the avenue to airline profits. It tried in 1980 to steer prices, used CRS signaling in 1988 - 1990, developed a vigorous response strategy to New Entrants, especially at its Dallas Airport hub, and tried to provide a "value pricing" model for the industry. American's CEO, Robert Crandall, took the witness stand twice to defend his company against allegations of undercutting their competition to drive them out of business (Northwest and Continental v. American et al. 1992; U.S. v. American et al. 2000). American also lobbied legislators to limit Southwest's Love Field Airport access. United, in contrast, almost seemed to be an industry outsider,

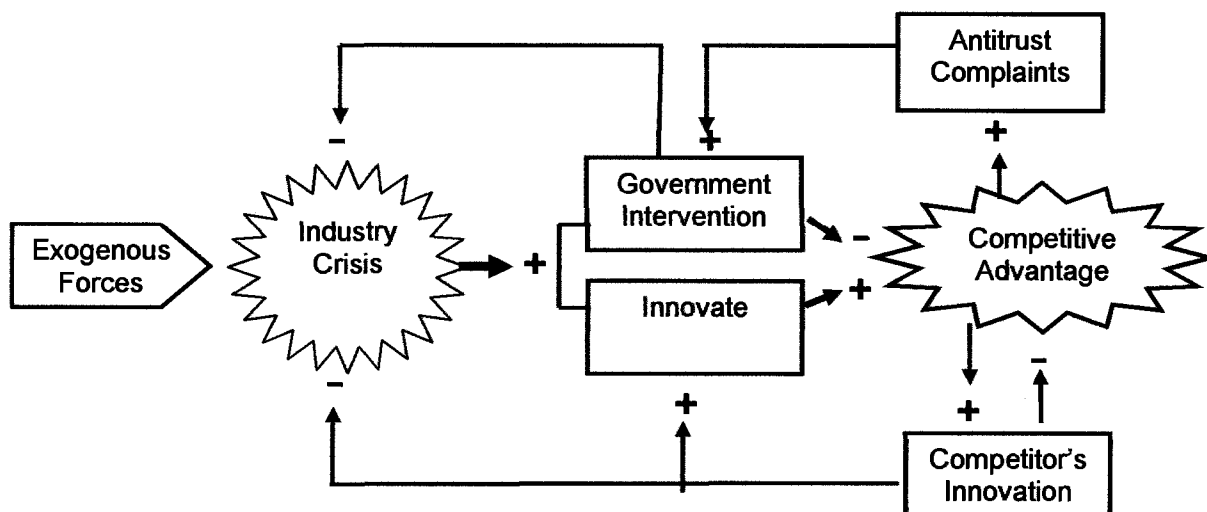
with lagging hub premiums, lack of mergers except the Pan Am Pacific routes, inability to purchase feeder airlines due to its pilots' contract, lack of slots except at its hub and headquarters, O'Hare Airport, its diversification strategy, and its orientation to international markets.

The interplay of innovators, close followers, industry followers, and industry outsiders has been outlined as all players respond to the innovation cycle. Because calls for government intervention are part of the innovation – regulation cycle, innovations and regulation are analyzed in the following section and, in particular, antitrust actions.

Innovation and Regulation

The innovation – regulation cycle was previously discussed in Chapter 2 and is shown again here in Figure 39. Radical innovations, by definition, always create above industry rents, and therefore attract government attention, especially in the airline industry, which is an oligopoly. As innovators attempt to defend their radical innovations as a key resource, calls for government intervention increase. Pressure mounts when above industry rents are extracted in the form of hub premiums. Additional government oversight is placed on the Hub and Spoke innovation because this innovation led to regional dominance by Incumbents. This section will attempt to understand the relationship of government intervention relative to the radical innovation of the Hub and Spoke.

Figure 39
The Innovation – Regulation Cycle



The Hub and Spoke as a key resource and its evolution into a radical innovation lies in its history as CAB awarded routes. CAB awarded two or so airlines routes and subsequent routes were awarded to the airline that dominated specific regions (e.g., Atlanta – Europe routes were awarded to Delta, whose hub was at Atlanta and extensively served the South). CAB did not award excessive airlines routes so that cost would not rise and the cross-subsidization of lucrative long-distance routes could counter unprofitable short-distance routes to smaller towns and communities. CAB's policies were driven by the social good of providing airline service for all American cities. Most importantly, however, large and medium-sized airports were full at the time of Deregulation. Therefore, a limited number of airlines at key airports already exhibited antitrust problems at Deregulation. Within a few years, airport concentration increased dramatically

(see Chapter 6) by the implementation of the Hub and Spoke, exacerbating antitrust problems. Further, because airports cannot be easily expanded, due to an assortment of problems such as funding, environmental problems, and Residual Leases, the supply of airport space is outstripped by demand and continues unabated.

As the number of Majors, both Incumbents and New Entrants, shrinks, concentration of market share at each hub increases, further exacerbating antitrust problems. Because the industry continues to suffer financially, the CAB-DOJ policy of allowing financially distressed airlines to merge increases antitrust issues at key hubs. Further, New Entrants continue to fail, and no other low-cost New Entrant has survived to prevent Southwest from becoming the monopolist, as predicted by Bennett and Craun (US DOT, 1993). In this scenario, who will protect the public from the monopolist, drive out excessive costs, and provide the public with the desired services?

Application of the innovation – regulation cycle to the Hub and Spoke is shown in Table 35, which reviews the crises, government interventions, innovations, and unintended consequences of the government interventions. A detailed walkthrough of Table 35 follows.

Deregulation unleashed an unpredictable income stream as a result of the business cycle and unlimited competitive entry. In response, United created the Hub and Spoke. Quickly mimicked by its competitors, airport market concentration rose as did above industry rents. The government, particularly

concerned about lack of competitive entry at slot-controlled airports, revised the High Density Rules in 1985, which had the unintended consequence of increasing slots for Incumbents. Incumbents were able to manipulate the rules even after the government once again changed the “use it or lose it” rules in 1989 for slot-controlled airports. Competitors purchased, merged, and otherwise gained control of key airport real estate, putting competitive pressures on American and United. American and Delta purchased feeder airlines to create secondary hubs and United purchased Pan Am’s Pacific routes. American and United used their CRS and its follow-on innovations to strengthen their Hub and Spokes, particularly as other competitors purchased CRSs to strengthen their regional control of key hubs.

Table 35 shows Southwest’s battle to access Love Field Airport and the government mandated compromise of the Wright Act which established perimeter controls to adjacent states. Faced by formidable litigation since Southwest’s founding over Love Field Airport, Southwest incorporated the satellite airport into its strategy. Satellite airports allowed Southwest to access metropolitan areas without having to directly confront Incumbents and complemented its Point-to-Point route network. Because of the restrictions on Love Field Airport, American enjoys hub premiums at nearby Dallas Airport for those passengers flying medium and long-haul flights. Other New Entrants followed Southwest’s strategy of satellite airports, particularly after the FAA expanded satellite airports and the PATCO strike led to severe flight restrictions

Table 35: Innovation – Regulation Cycle for Hub and Spoke

Crisis	Government Interventions	Innovations	Unintended Consequences
Competitive entry and business cycle	Deregulation allows competitive entry	Hub and Spoke by United, followed by American	Increased market dominance and above industry rents
Hub and Spoke crisis for competitors	Government studies and hearings; High Density Rule Change of 1985 and 1989	Mimetic innovation by TWA, Delta, Northwest, and Texas Air	Competitive crisis for first movers American and United; Incumbents increase slots
Competitive crisis for Hub and Spoke first movers American and United	Approves mergers of airlines for Delta, Northwest, and Texas Air	Purchase feeder airlines by American and Delta; Pan Am Pacific routes by United	Secondary hubs created with above industry rents
Southwest denied access to Love Field Airport for interstate travel	Wright Amendment of 1980; Shelby Act of 1997	Satellite airports and Point-to-Point route network by Southwest	Dallas Airport hub premiums for American
New Entrants unable to access large and medium-sized airports	FAA provides funding for satellite airports; PATCO strike	New Entrants mimic Satellite Airports usage	Satellite Airports congested and don't meet FAA minimum runway requirements
Competitive crisis for Incumbents	Passenger Facility Charges; FAA Reauthorization Act 1994	Develop close relation with airport authorities and DOT	PFC backed airport projects used for Incumbents' benefit; DOT does not approve New Entrants at slot-controlled airports; severe delays
Loss of service to small cities	Deregulation allows competitive exit; government studies and hearings	Feeder airlines, code share alliances to Hub and Spokes	High fares to small cities

at the largest airports. However, because airport funding has not kept up with demand, all airports, including satellite airports are congested. Further, because satellite airports, located in dense urban areas, were often replaced by bigger airports for larger airplanes, these satellite airports are unable to expand their runways and support larger airplanes. Incumbents, tied into a pre-Deregulation airport expansion funding system, are able to control expansion through Residual Leases and MILs. The government approved PFCs that were intended to aid airport authorities in expanding airport space without needing Incumbents' approval. However, conservative bond markets still require Incumbents' approval of PFC-backed projects in case airport authorities are unable to collect sufficient PFC revenues. Incumbents can then be forced to pay PFC-debt obligations under their Residual Leases. Incumbents continue to exert control on PFC-backed projects and receive benefits from them.

The government tried to open slot-controlled airports, except National Airport, with the FAA Reauthorization Act of 1994. The GAO found DOT was sympathetic to Incumbents and did not approve any New Entrants' request for routes if Incumbents were already flying the route non-stop. When DOT did open slots to O'Hare and JFK Airports, the airports were quickly overwhelmed by Incumbents and new competitors, causing the national and international airspace to experience delays. As a result of those delays, the FAA is proposing the reinstatement of slot controls at JFK and Newark Airports.

While the government knew that Deregulation allowed for exit from routes, the loss of service to small cities and towns was rapid and acute. United responded to the political and public pressure by creating code-sharing alliances with small feeder airlines, who moved passengers from small cities to United's hubs. While this provided small cities with more frequent and better quality service (one-stop) to many destinations, the government was critical of the hub premiums that Incumbents earned on these short routes. Despite CAB's policy of subsidizing small city, short-haul service with profits from densely populated cities with long-haul service, and the recognition that the Hub and Spoke is an expensive operation to maintain, government studies complain of the above industry rents charged for small city service. The government also provides access to slot-controlled airports from small cities, even though there is greater demand for access from larger cities to slot-controlled airports and greater potential airline revenues.

The regulators pursue complex and often conflicting goals under the Deregulation Act. CAB was well aware of the cross-subsidies given to small cities from larger cities. Therefore, it should not be a surprise that the cost to provide service to small cities under Deregulation is more expensive. United's solution of creating code-sharing feeder airlines solved this problem, but at the cost of operating the Hub and Spoke. The EASP was meant to provide a short-term subsidy for small cities to adjust to Deregulation. Instead, the program, which cost over \$110 million per year, has been made permanent and those cities that

receive it believe it to be an entitlement (Bailey, 2006c). These efforts by the government reflect the social policy of providing air service to small cities even though it is not a criteria for Deregulation: airline free entry and exit from any market is. Economists recognize economies to scale that provide lower costs to more densely traveled routes (Brueckner & Spiller, 1994). The various government studies cited in this Section reflect the DOT's desire to provide all American cities, regardless of size and cost, with low-cost airline services.

The government also seeks to open slot-controlled airports, yet their policies toward Love Field and National Airports do not reflect that goal. The GAO said the Metropolitan Washington Airports Act of 1986 should be modified and National Airport included under the FAA Reauthorization Act of 1994 to encourage competitive entry. Love Field is not located in a densely populated area and stands in stark contrast to La Guardia and National Airports as the nation's perimeter-controlled airports. Southwest has endured perimeter controls since 1980 under the Wright Act and has been seeking removal of perimeter controls since the early 2000s. The chances for removal of restrictions at Love Field Airport seem remote as there is insufficient support within the Texas Congressional delegation to remove perimeter limits. Finally, even if Congress passes legislation supporting removal of slot controls at JFK, La Guardia, and O'Hare Airports, the DOT feels the need to protect Incumbents from New Entrants that reduces revenues and increases flight congestion.

The inability to remove slot controls from JFK Airport and the reinstatement of them at Newark Airport after an almost 30 year hiatus reflects the increasing congestion at the nation's airports and airspace. Without ample airports, equipment, and personnel to manage the airspace, the entry of any New Entrant to the system, as well as increased competition from existing airlines is not possible. The limiting factor prior to Deregulation was large and some medium-sized airports, with the worst being slot-controlled. The limiting factor remains airports, but has spread to all sized airports, including satellite airports used by New Entrants. With the increase in private airplanes, air taxis, very-light jets, and international competition due to Open Skies agreements, the demand for airports is increasing, not decreasing. Yet, the supply of airports relative to demand is decreasing, and the prospect for new airports and airport expansions is low due to funding problems, environmental constraints, and the public's basic intolerance for another airport in their backyard.

It is likely that regulators contemplating deregulation never considered the airport infrastructure problems facing Incumbents, New Entrants, and airline competitors and how it would impact the industry. Yet it is clear that airports do constrain New Entrants and Incumbents do everything possible to maintain their positions of power. Without an increased supply of airports, this imbalance in demand and supply will continue into the future, with no relief in sight. How this imbalance is solved is beyond the scope of this thesis. However, without a

solution, free entry as legislated under the Deregulation Act will not occur and hub premiums will continue, particularly in perimeter- and slot-controlled airports.

Free Market versus Empty Core

We have seen how crises create innovations, particularly radical innovations, which offer an industry and its innovator the benefit of above industry rents and future resources. We have also seen how radical innovations as key resources draw antitrust regulatory attention. This is particularly problematic given the shrinking number of players in the industry. If the airline industry does indeed have an empty core, as supported by evidence in Chapters 3 and 5, how do innovators take advantage of their radical innovations despite the government's antitrust efforts? If, on the other hand, the industry does not have an empty core and the free market view prevails in the US and EU, who should benefit from the radical innovations – the innovator, the industry, or the public – and how should radical innovations be balanced against antitrust issues and free markets with competitive entry? Probably more important to the Hub and Spoke case than the CRS case, can infrastructure problems which impact the Hub and Spoke and competitive entry be solved to allow for free markets?

As discussed in Chapter 2, two competing ideas to solve the industry's problems offer opposing solutions. The radical innovation of the Hub and Spoke and its implementation by Incumbents allowed barriers to entry to arise at key airport hubs, leading to above industry rents. Hub and Spokes evolved into spheres of influence, and the oligopoly evolved into a détente of tacit cooperation

and coordination to retain above industry rents, which solved the empty core problem. However, in response to high hub premiums and aggressive competitive responses of Incumbents to New Entrants, the government, at the behest of Congress, consumers, and New Entrants, tried to break down hub barriers through PFCs, changes in laws, and antitrust lawsuits.

One of the more interesting elements in the Hub and Spoke analysis is the reversal of fare subsidies pre- and post-Deregulation. Prior to Deregulation, CAB and Congress felt it critical to cross-subsidize short-haul flights with more profitable long-haul flights. Post-Deregulation, long-haul prices are too low because of intense competition among Incumbents and New Entrants, and high prices are on short-haul local flights that connect to an Incumbent's hub. Incumbents with Hub and Spokes use short-haul flights to subsidize long-distance flights and to maintain expensive Hub and Spokes.

While both DOT and GAO (US GAO, 1990a, 1996) praised Hub and Spokes for their quality of service to medium and small-sized communities and recognized the high costs to maintain them, they attacked Incumbents' hub premiums. As government efforts to remove hub premiums worked, and Southwest and other New Entrants gained access to hubs, Bennett and Craun concluded the industry's profitability picture was impacted by,

... long-haul prices that are perhaps too low in relation to cost because they are so competitive, and ... short-haul prices that are too low because of ... Southwest. Given these constraints, it would appear that in order to return to profitability the other major airlines ... must increase their long-haul prices, and reduce their short-haul costs (US DOT, 1993, p. 6).

Yet, in the same document, Bennett and Craun recognized that Incumbents were unable to compete against Southwest's lower costs (US DOT, 1993) and as McCabe (1998) concluded, it wasn't just low costs on which Southwest competed, but an array of factors that led to its effectiveness as a strong competitor. With low profits in both long and short-haul flights, costs as low as possible given the latest round of bankruptcies by most Incumbents, and an unwillingness to confront Southwest directly, the Incumbents have chosen to pullback or abandon routes in competition with Southwest and move to lucrative international routes. This, in turn, has led to congested flights, flight delays where smaller airplanes are now used, and a lack of any excess capacity among Incumbents to handle operations problems such as weather or airplane mechanical problems. This move by Incumbents will provide them with protected profits to survive until lucrative international routes are eliminated by Open Skies agreements and further deregulation or liberalization abroad.

Bennett and Craun expressed concern as to whom will protect the consumer from Southwest as it dominates markets,

Without a competitive discipline, over time Southwest's fares will increase to cover cost inefficiencies that will creep in, and to extract monopoly profits. We already see Southwest's prices beginning to increase where it has forced out its competitors... In markets dominated by Southwest more effective low-cost competition is needed to keep fares low and to maintain a competitive level of service (US DOT, 1993, p. 9).

Further, who will replace Incumbents as they lose their hub premiums on short-routes to Southwest and other low-cost New Entrants and subsidized foreign airlines, and continue to compete at too low prices relative to cost (US DOT,

1993)? The free market solution has been for Southwest and other low-cost New Entrants to expand and eliminate most Incumbents as domestic competitors except in special niches like slot-controlled airports, gateway airlines to international locations, or remote locations with EASP subsidies. Free market proponents seek additional New Entrants such as JetBlue, owned 19.8% by Lufthansa, and Virgin America, owned partially by Virgin entrepreneur Sir Richard Branson, to maintain competitive costs domestically.

The limiting factor, however, will be the capacity of the national airspace and airports to handle growth, as airports remain congested and efforts to remove slot controls have been unsuccessful at various airports such as JFK and O'Hare Airports. Airport access, even at satellite airports, will remain a key resource, as the conditions that limit them have worsened as demand has increased for air service. Slot-controlled airports will become increasingly valuable and have not seen the reduction in hub premiums as seen at other Concentrated Airports.

The empty core solution theory predicts Incumbents build hub barriers to maintain hub premiums that allow them to earn sufficient profits to pay for Hub and Spokes and cover lean periods. However, the ability of Incumbents to maintain hub fortresses has declined as the government attacks hub fortresses through a process of legislation, regulation, and antitrust actions. As discussed above, without sufficient profits, the Incumbents have reduced their domestic presence and moved to more lucrative international flights to maintain overall

profitability. With Open Skies approved for the European Union, profits will decline from international flights, forcing more Incumbents to fail.

A separate comment should be made about Assistant Secretary for Aviation and International Affairs of DOT Andrew B. Steinberg's statement to the Senate Committee on Commerce, Science, and Transportation. In that testimony, Assistant Secretary Steinberg said, "I am confident that if we can avoid another cycle of bankruptcy, there is every reason to expect US airlines to succeed in exploiting their advantages to profit from the tremendous growth opportunity offered by the liberalization of international aviation markets through 'open skies' agreements" (Senate Committee *Statement of Andrew B. Steinberg*, 2007, p. 5).

Assistant Secretary Steinberg expects Open Skies agreements with the EU to open European markets to US airlines. Conversely, these agreements also open US markets to EU airlines. While Open Skies agreements do not open domestic markets to foreign airlines, that is a foreign airline still could not fly from say Los Angeles to Chicago, the eventual goal of free market proponents is to allow for foreign airlines to fly domestically (Winston, 1999). Assistant Secretary Steinberg believes that, with the opening of new markets, US airlines will be able to avoid bankruptcies that occur during recessions or other shocks. Let us examine the evidence provided by the Hub and Spoke case:

1. The US airport and airspace market are unable to meet existing demand, with slot-controls reinstated at two key US international gateway airports — JFK and Newark Airports.
2. Whether US or EU airlines fly into US or EU airports, they will face the limitations of lack of airport and airspace in the US. Similar conditions exist in Europe, particularly London's Heathrow Airport that prior to Open Skies, was restricted to two US airlines, American and United (Higgins, 2008b). Just as when JFK Airport's slot controls were partially removed, congestion at JFK Airport caused delays domestically and internationally, so too do congestion and operation problems occur at constrained airports abroad.
3. US airspace is already constrained and lack of funding continues to hamper necessary upgrades. Booz Allen Hamilton, a US consulting company working for the EU, predicted that the Open Skies agreement would generate 26 million additional passengers over 5 years (Sharkey, 2007a). Currently about 50 million passengers travel between the two regions annually. As discussed in Chapter 8, funding for US airports and airspace rely primarily on Incumbents. Incumbents will again be faced with the issues of providing airport space and funding airspace improvements for new international competition as a result of the Open Skies agreements. This occurs at a time when Incumbents are extremely cost constrained.

4. Currently, fares are protected by bi-lateral country agreements. These protected fares provide US and EU airlines with significant revenues. With increased competition, there will be increased pressure on fares and on airlines to cut operating costs, as predicted Booz Allen Hamilton (Sharkey, 2007a). US Incumbents have already cut their costs significantly in the 2002 – 2006 cycle of bankruptcy. Incumbents face historically high fuel prices and high debt ratios during a liquidity crisis that may preclude them from accessing additional capital to bridge their financial problems and from buying more fuel-efficient airplanes. The EU airlines are not similarly constrained and are in better financial health than Incumbents. In a fare war between EU airlines and Incumbents, EU airlines are better able to weather a fare war, increased competition, high fuel prices, and a recession.
5. Fare wars on previous lucrative, protected international routes will cause US Incumbents to have fewer opportunities to build profits to withstand the empty core. Since Incumbents have abandoned the domestic market to Southwest and other New Entrants, Incumbents will now have to abandon international routes subject to Open Skies agreements and seek those international routes that remain protected by bi-lateral agreements. These routes are primarily in the Asia Pacific region. Incumbents are vying for fewer routes that are profitable enough to survive the empty core.

The author chooses to disagree with Assistant Secretary Steinberg's assessment that Open Skies agreements with the EU will provide Incumbents with an opportunity to gain significant profits in international markets. In fact, it is the author's belief that the current US – EU Open Skies agreement will cause a more rapid decline into bankruptcy or mergers by Incumbents.

Conclusion

Which view, the free market or the empty core, most closely depicts the Hub and Spoke in the airline industry? The free market view supports unlimited entry and no government controls. However, the dilemma for free market proponents in an oligopoly is the problem created by radical innovations that lead to above industry rents, market barriers, and monopolistic activities. The problem for free market proponents is the lack of an adequate balance between demand and supply for airports. Without a balance, airports become a key resource as defined by Penrose (1959) and Wernerfelt (1984), and Incumbents use of the Hub and Spoke as a radical innovation exacerbates the problem. In contrast, the empty core suggests that no long-term financial equilibrium exists because of the inability of the industry to decrease production to match severe declines in demand.

If the free market view prevailed in the Hub and Spoke case, then American would have been unrestrained in its ability to build hub fortresses and would not have faced unremitting regulatory antitrust actions. Further, CRS signaling in support of hub fortresses and spheres of influence would not have

been halted by the government's lawsuit in *U.S. v. Airline Tariff Publishing Co. et al.* (1992). Finally, the efforts by the DOJ to stop predation in *U.S. v. American et al.* (2000) and to make American the test case, at the urging of its competitors, would not have happened even though the courts found for American.

I, however, would argue that the free market view could not have prevailed due to the conditions that existed prior to Deregulation: congested large and medium-sized airports; slot-controlled airports; PATCO strike; GARBs and other limited means to finance airport expansion, including reliance on Incumbents to finance airport expansion for New Entrants; airport authorities' standard operating procedures, policies, and self interests; Residual Leases; MIIIs; and environmental concerns. In fact, few of the conditions that constrained airport supply to meet demand in the past have changed to allow for the free entry of competitors, a requirement of the free market view. The airport supply problem and its lack of resolution in the near future, especially at slot-controlled airports, support the empty core theory. Government must manage the slots so that the national and international airspace is not severely impacted and can function. This is not a free market solution, but a regulatory solution.

The G. W. Bush Administration's response to newly reinstated slot-controls at JFK and Newark Airports is to auction off the slots to the highest bidder. Each Incumbent would be able to retain 20 slots/day, but 10% of the remaining slots would be auctioned off over a 10-year period (Wald, 2008d). While an Incumbent could bid on its slots at Newark Airport, that would not be the

case at JFK Airport and the auction process would be accelerated to 20% over a 5-year period. The DOT explained the difference in treatment of Incumbents by saying that Continental has 72% of the departures at Newark, and thus it was deemed it would not be fair to Continental (Wald, 2008d). Despite the DOT's version of "what is fair," JFK has the lowest hub premiums of all the slot-controlled airports and is headquarters to JetBlue, a New Entrant. In contrast, Newark Airport has a significant hub premium (see Appendix H). This does not appear to be an appropriate free-market response to a slot-control problem.

Can the industry innovate out of its problems, whether it contains an empty core or not? The Hub and Spoke allowed Incumbents to build up reserves at Hubs to withstand recessions, shocks, and the cost of maintaining expensive hub networks. However, because of unlimited entry which lead to severe fare wars and Southwest's recent entry into hub fortresses, the Hub and Spoke can no longer support hub premiums to survive in the long run. In fact, Hub and Spokes are being dismantled by Incumbents as they try and improve airplane utilization and forestall the need to purchase additional airplanes. The analysis shows that the conflict between antitrust and Hub and Spokes force the innovator to give up his/her key resource.

Endnotes

1. There are three types of isomorphic forces: mimetic (standard responses to uncertainty (i.e., modeling after industry leaders, following industry leaders in times of crises)); coercive (political influence and problems of legitimacy); and normative (professionalization of industry or institutions (i.e., consultants)) (DiMaggio & Powell, 1983, p. 150).

SECTION 4**CHAPTER 11****CRISIS AND INNOVATION – POLICY AND SURVIVAL**

We have just completed the historical review and analysis of two radical innovations in the deregulated airline industry, the computer reservation system (CRS) and the Hub and Spoke. The former represents a technological innovation while the latter represents the use of an operations solution to strategically create barriers to competitive entry at key airports. This discussion will compare and contrast the two cases and answer the underlying questions of free market versus empty core theory. Depending on which view prevails, suggestions will be made as to how to best facilitate the changes that will accommodate institutional forces to further that view. This discussion will also examine crisis and innovation and its role within the airline industry with an eye towards whether innovation will aid in its long run survivability and the public good. Finally, this chapter raises issues of why the US needs a viable airline industry and suggests future research on this important topic.

Comparison of the Cases

The CRS and Hub and Spoke share many similarities. They both:

1. Were key resources that generated above industry rents;
2. were used strategically by the innovator, United, and close follower, American;

3. led to another radical innovation, by Southwest;
4. caused bandwagon effects on the part of other airlines, Continental, Delta, Northwest, Texas Air, and US Airways;
5. created follow-on innovations;
6. brought close antitrust oversight; and
7. followed the innovation – regulation cycle (see Chapter 2).

Despite these similarities, however, there are many differences between the two cases. Probably the most significant is the fact that the CRS is an information technology strategy that represented a new way of doing things while the Hub and Spoke converted an operations solution into a strategic solution that made airports and their related real estate a key resource. Because the CRS is a technological solution, rules were created as the innovation impacted the industry and the innovators responded to government and competitors' responses. In the case of the Hub and Spoke, however, it was not obvious that United's Hub and Spoke strategy would transform the industry and there were many skeptics. The value of the Hub and Spoke as a key resource was not apparent until the fight over National Airport's slots and the crisis surrounding the PATCO strike revealed that the Hub and Spoke could forestall competitive entry, if not block it for years. Because the Hub and Spoke was less obvious an innovation than the CRS, government antitrust response was slower. The Hub and Spoke is based on deeply embedded institutional practices. The ability of Incumbents to control key hubs lay in their tacit knowledge and understanding of practices, standard

operating procedures, mutual self interests, legal documents, local, state and federal laws, bond markets, and local communities. This deep institutional focus is traced in Chapter 10.

While the CRS and the website changed the industry within a few years if not a few months, the Hub and Spoke changed the industry at glacial speed, and indeed many of the practices found today were created in the pre-Deregulation era. Finally, the CRS began as a duopoly and evolved into an even playing field with the advent of the website. In contrast, the Hub and Spoke used airports as a key resource and due to the imbalance between supply and demand for airports, an even playing field never evolved. While satellite airports allowed New Entrants to enter major cities and the national airspace, the continued imbalance between supply and demand remains regardless of type of airport, and is worsening. The reinstatement of slot controls at Newark Airport after a 38-year hiatus is indicative of this imbalance. Airports, particularly slot-controlled airports, remain a key resource.

Research Questions

This thesis raised three questions. First: what is the relationship between crisis and radical innovation? Second: how can institutional persistence act as a major roadblock to change? Third: can the airline industry financially survive under its current regulation structure, using the lens of the free market view versus the empty core theory? These questions will be reviewed below.

Crisis and Innovation

One question raised by this thesis is the relationship between crisis and innovation. Raider's (1998) research suggests four relationships, all confirmed by the two cases:

1. Innovation is greater among companies when the competitive environment is most severe;
2. companies that face strong, oligopolistic buyers and suppliers have higher rates of innovation and R&D investment;
3. constrained industries use R&D to break out of constrained positions to increase market share, open new markets, and improve quality or increase profit margins; and
4. memberships in large networks constrain innovation.

Each of these will be discussed in turn.

Innovation is greater when the competitive environment is most severe.

In the face of complex and expanding airline market demand, the problem of "too many tickets to process manually" led United to exploit its CRS, a radical innovation. The chaos of the post-Deregulation environment, labor unrest, high fuel costs, and a likely recession forced United to rethink its route network structure and create the Hub and Spoke as a radical innovation.

Companies that face strong, oligopolistic buyers and suppliers have higher rates of innovation and R&D investment.

Southwest faced oligopolistic suppliers when three of four CRS suppliers limited Southwest's ability to sell tickets, and the fourth CRS supplier charged "excessive" fees. To counter this, Southwest created a robust website, taking advantage of increased public usage of the Internet as well as previous innovations by ValuJet and Alaska. Southwest also faced oligopolistic suppliers in its attempt to access key airports, Midway, Detroit, and Minneapolis. Once Midway-Southwest applied for CAB route authority, it found ten Incumbents applied for the same routes where only one Incumbent previously flew to Midway Airport. At Detroit and Minneapolis Airports Southwest found Northwest discouraged entry through the use of TACOs, high sublease rates, and tying ground services to gate subleases, such that Southwest vowed not to enter any constrained airport in the future. In response to these barriers Southwest incorporated entering satellite airports as a key strategy and avoided head-to-head competition with Incumbents until it had sufficient resources to survive such an entry. There was no evidence in the cases of strong, oligopolistic buyers.

Constrained industries use R&D to break out of constrained positions to increase market share, open new markets, and improve quality or increase profit margins.

Government authority before Deregulation constrained the airline industry to limited profit opportunities. With the advent of the CRS, not only were

American and United able to create an information hub for the travel industry, the CRS and its follow-on innovations led to mimetic innovations in other industries and improved quality. It also created new services and markets, market barriers, and above industry rents. The Hub and Spoke follow-on innovation of alliances allowed United to break out of constraints caused by bi-lateral country agreements to open new markets, increase market shares, improve quality, and increase revenues. These alliances have spread to many industries (e.g., pharmaceutical) which allow for low-cost, low risk expansions into new markets.

Memberships in large networks constrain innovation.

This can be seen in Delta's inability to take advantage of its CRS due to Agents' constraints. In the case of the Hub and Spoke, the alliance innovation was one that American has failed to capitalize upon due to constraints by its oneworld partner, British Airways.

Since crises can create innovations, and in particular radical innovations, a more fundamental question raised by this thesis is who should benefit from these innovations? The evidence provided in this thesis supports the existence of an empty core, as is outlined and reviewed below. The question remains: can airline innovators use radical innovations to overcome the empty core, survive in the long term, and provide the public with air service? Or, should radical innovations be diffused throughout the industry so the public benefits from low cost fares? Since the CRS is an example of a technological innovation

unimpeded by market supply and demand constraints, it is the easiest case for the reader to follow the implications of the radical innovation to solve the empty core.

Assume for a moment that American had been able to execute its strategy of becoming an information technology company, including its proposed merger with Delta's CRS. Based on a comparison of Sabre Holdings and American's revenues and profits between 2004 – 2006 (see Chapter 5); the valuation of Sabre Holdings as larger than American's core airline business (Clemons & Weber, 1990); the return on capital for CRS versus the core airline business from 1992 – 1996 (30% versus 7%) by McKinsey and Company (US GAO, 2005a); and the operating profits for CRS versus the core airline business from 2000 – 2001 (15% versus 5%) by Airline Business (US GAO, 2005a), then it is possible that American could have bridged the empty core. The merger of Delta's and American's CRSs would have further strengthened American's financial position. Whether American would have ultimately jettisoned its airline operations because of poor financial performance or not is a matter of conjecture. However, it is obvious that with Sabre Holdings, American would have been financially stronger to weather the inevitable recessions and crises that strike the industry.

United was forced by key stakeholders to divest 50% of its CRS to a consortium of foreign airlines and US Airways and abandon its travel related industry strategy. While United was the CRS innovator, it was not as effective as American in creating as many follow-on innovations, controlling key resources,

and obtaining above industry rents. United, despite its radical innovations, was unable to survive the empty core, declared bankruptcy in 2002, and once again sought a merger partner to survive the economic recession caused by the housing crisis and historically high fuel prices (Maynard, 2008e).

While the CRS and websites eventually diffused through the industry and beyond into the business world, its initial benefits to American, United, and Southwest solidified their leadership and financial positions in the industry and allowed them to invest in follow-on innovations. The innovations' diffusion rate depended upon whether they were key resources. The CRS is a key resource, that if it is rare, valuable, difficult to imitate, and has no substitutes, and therefore the innovator was able to control its diffusion into the industry and to competitors. However, the website, not a key resource, more quickly diffused into the industry and beyond. American managed to retain the CRS as a radical innovation and key resource for 25 years, earning significant above industry rents and a possible way out of the empty core. Meanwhile, the website allowed Southwest and the rest of the Majors to drive down commission costs from \$6.6 billion/year to \$1 billion/year, but it was not a sustainable competitive advantage and it diffused rapidly through the industry. For example, JetBlue was able to quickly mimic Southwest's website innovation and achieve a greater percentage of revenues derived from its website than Southwest.

As discussed earlier in Chapter 5, if the benefits of radical innovations are taken from innovators, radical innovations soon lose their importance in moving

an industry forward and enabling it and its players to solve critical problems. Why should anyone spend scarce resources to create a radical innovation only to have its benefits confiscated? Why create a radical innovation when your competitors can ask regulators to even the playing field and diffuse the radical innovation into the industry, while they spend their resources on other competitive strategies? Finally, this highlights a conflict of a basic premise of free markets: the ability of a company to innovate and benefit from innovations versus the right of regulators to confiscate those benefits in a critical, but shrinking oligopoly-like industry. Given the discussion of regulation, oligopolies, and radical innovations (see Chapters 5 and 10), it is impossible to imagine that innovators will be allowed to benefit from their radical innovations unimpeded. This issue drives the airline industry to a regulatory empty core solution as antitrust regulators in a free market will always choose to regulate radical innovations. A fuller discussion of these issues is beyond the scope of this dissertation but raises the questions as to who should benefit from radical innovations and the need for radical innovations to solve critical issues.

United and Southwest were the most innovative airlines in the two cases. Additionally, United was able to use bankruptcy to jettison its legacy pension costs, another radical innovation that was quickly mimicked. Those airlines that did not use the bankruptcy innovation have found themselves in worse financial condition because they have higher costs relative to the industry average. As Andrew B. Steinberg, Assistant Secretary for Aviation and International Affairs of

DOT said in testimony before the US Senate Committee on Commerce, Science and Transportation,

Respected airline industry analysts have frequently observed that the airline industry is ... easy to enter and hard to leave - ... an "exit barrier" for failed firms that is the inadvertent consequences of Chapter 11 ... airline stakeholders (lenders, suppliers, employees) - any one of whom could singly cause an air carrier's demise - rarely force such an outcome ... the net result of those decisions is, perversely enough, that those carriers who manage to avoid bankruptcy eventually find themselves at a serious competitive disadvantage (Senate Committee *Statement of Andrew b. Steinberg*, 2007, p. 4).

Thus, we see that crises do indeed create radical innovations, and in turn, in a free market environment regulators seek to diffuse radical innovations to benefit consumers. Those radical innovations that remain key resources despite antitrust efforts provide the innovator with the most benefits, such that it may be possible for that innovator to survive the empty core.

Institutional Persistence and Complexity

The second focus of this thesis is institutional persistence as a major roadblock to change. Using the GCSB Framework, the researcher reviewed the responses of key players to the potential loss or gain of resources and control over the environment in the two cases (see Chapters 5 and 10). We learned that change is difficult in the airline industry and that government actions often had the unintended consequence of producing the opposite effect of their stated goals. This was evident in the Hub and Spoke case. In that situation, the High Density Rule changes of 1985 and 1989 inadvertently increased Incumbents' slot control, and the Federal Aviation Reauthorization Act of 1994, which involved the

removal of slot controls at JFK Airport, caused delays in the national and international airspace, and forced reinstatement of slot-controls at JFK and Newark Airports. The Hub and Spoke case is particularly complex because it is nested within an institution made up of airports and airspace, complicated infrastructure funding, multiple layers of federal, state, and local laws, long lead times to construct new infrastructure, long lease terms, and conflicting stakeholders' interests. The demand and supply for airports was never in balance in the pre-Deregulation era, and the complexities previously outlined exacerbated this imbalance, creating airport market distortions. Incumbents took advantage of these market distortions and used them as key resources to create hub fortresses, market barriers, and above industry rents.

While DOT was responsible for increasing slots at JFK, La Guardia, and O'Hare Airports under the Federal Aviation Reauthorization Act of 1994, the GAO found that DOT failed to grant New Entrants slots if an Incumbent had a non-stop flight on the proposed route. DOT "... concluded that eliminating the slots would not be in the public interest because the project benefits to consumers would be outweighed by the negative impacts on the incumbent airlines in terms of flight delays and reduced profits ..." (US GAO, 1996, p. 8). DOT cited the legislative background as why it failed to grant a competing non-stop route to a New Entrant while GAO was unable to find such Congressional guidance. Consideration must be made of what Stigler (1971, p. 3) described "... as a rule, regulation is acquired by the industry and is designed and operated primarily for its benefit."

Incumbents, according to Stigler, benefited from DOT's leniency because they controlled the regulators. Thus, while free market proponents seek free markets for the airline industry, this remains a difficult if not impossible task given institutional constraints, the complexity outlined in the GBSC Framework, the imbalance of the supply and demand for airports, regulation primarily for the benefit of the regulated, and FAA and the public's goals and need for commercial air service regardless of profitability.

The GCSB Framework addresses the importance of the industry outsider in creating radical innovations. The responses of industry outsiders to crises are not constrained by the institutional forces that restrict the behavior of others deeply embedded in the industry. In specific, United, led by a management team from outside the airline industry, created the CRS and Hub and Spoke radical innovations and Southwest, a population outlier, created the website and satellite airports as radical innovations. Finally, while not covered as a case study, United, led by a CEO from the oil industry, created the radical innovation of bankruptcy to jettison legacy pension costs. These atypical, nonisomorphic responses appear to occur more frequently when companies fear the loss of control over resources. However, that does not mean that industry outsiders do not use expected, isomorphic responses to crises especially when the crisis overwhelms the industry, such as happened when the industry requested a government bailout following the 9/11 terrorist attacks, United's three attempts to obtain loan

guarantees, or Southwest's use of the courts to block Incumbents from entering Love Field Airport, its hub and headquarters.

The GCSB Framework appears less helpful in providing guidance on the free market view versus the empty core theory. Radical innovations and their follow-on innovations appear to produce both empty core and free market solutions. Time may increase the likelihood of a free market solution as seen in the Hub and Spoke case study (i.e., more free market solutions occurred as time passed), possibly lending some credence to the free market proponents belief that more time is needed to dismantle regulatory regimes. It also could have been the examples selected for the Hub and Spoke case.

Free Market versus Empty Core

The third and primary question of this thesis is whether the industry can financially survive under its current regulation structure. Chapter 3 describes key airline industry economic characteristics — high fixed costs, mixed-business-cycle indicator, sensitivity to the business cycle, discretionary and perishable product, and oligopoly-like industry. These industry characteristics cause the industry to behave in certain ways, particularly in times of recession and crises. Three measures of financial performance, profit and loss (P&L), debt to capital ratios, and Economic Value Added (EVA), are used to evaluate the financial health of the industry with the following results:

1. P&Ls show increasing volatility since Deregulation and the continued inability of the industry to recover from recessions with sufficient surpluses to carry over into the next downturn;
2. debt to capital ratios are deteriorating with increased bankruptcies and the inability of the industry to shoulder more debt to weather future crises or replace aging fuel-inefficient fleets (Bailey, 2007a); and
3. EVAs show that the industry has not been profitable for shareholders during the entire period since Deregulation. Continental had the best EVA as a result of its bankruptcy in 1994 and shedding of debt, and Southwest had the second best EVA results. Continental's emergence from bankruptcy shows how relief from the weight of high debt and a fixed cost structure produce the industry's best EVAs. From 1978 to 2005 the eight Majors including Southwest, produced positive EVAs 14% of the time, meaning investors' investments were greatly diminished most of the time by substandard returns.

One would expect that the industry would adjust to the business cycle the further it moves from Deregulation. If the free market view provides the industry with financial well being, then one would expect that the three measures of financial performance would improve over time as more regulatory restrictions are removed and the industry, airlines, and key stakeholders adjust to Deregulation, but the opposite has occurred. If the empty core theory prevails here, one would expect that the further in time the industry moves from

Deregulation the worse the financial state of the industry would become, which matches the three measures of financial performance. Therefore Chapter 3 supports the empty core theory.

The CRS innovation allowed United and American to obtain above industry rents, maintain an effective duopoly, and create an information hub for the travel industry. Further it provided the innovator with a means to bridge the empty core as seen in the greater returns for CRSs than the core airline business. DOT alleged United and American realized returns on investments of 108.9% and 129.5%, respectively, from their CRS business, and \$2 - 3 billion/year of additional revenues due to Agents' "halo effects" (House Subcommittee *Airline computer reservation systems*, 1988). If, as outlined in Chapter 5, American had become an information technology company rather than an airline company, or had kept Sabre Holdings as part of a diversification strategy, American could have innovated out of the empty core. In fact until its divestiture of Sabre Holdings, American maintained a market share of 40% or more and created most of the follow-on innovations. With neither the CRS nor a diversification strategy, airlines suffered from the empty core.

The CRS did not work as a free market solution and had to be abandoned by American and other airlines because of unrelenting antitrust actions. United chose to exit the regulatory spotlight, divested 50% of its CRS to a consortium of airlines, and focused on an airline-only strategy. American and Delta were forbidden to merge their CRSs for antitrust reasons and American was forced to

sell Sabre Holdings. Currently without their CRSs, the airlines are in much poorer financial condition. They must now pay for services from which they previously earned income. Current non-airline, CRS owners can charge high fees as a duopoly and the ability of airlines to create CRS follow-on innovations is lost. As government antitrust actions forced the divestitures of CRSs that could have allowed at least American to bridge the empty core, the CRS case study supports the thesis that the airline industry suffers under the empty core.

The Hub and Spoke case brings to light a central question: could a free market solution ever prevail in the airline industry due to the imbalance of supply and demand for airports and airspace? The current archaic infrastructure and airport funding process allows hub fortresses to remain, particularly at the slot-controlled airports: JFK, La Guardia, National, Newark, and O'Hare. With projected increases in general aviation in the form of corporate jets, air taxis, and very-light jets; increased usage of small regional jets by Incumbents; and international traffic due to Open Skies agreements, airport and airspace congestion is expected to increase, further exacerbating the imbalance.

By using follow-on innovations of the Hub and Spoke and CRS, Incumbents maintained hub fortresses until government antitrust actions and the rise of satellite airports and New Entrants removed some hub barriers. During periods of détente and mutual forbearance, Incumbents continued to realize above industry rents, cross subsidized less profitable routes with more profitable ones, minimized fare wars, and essentially bridged the empty core. Hub

premiums were earned at Concentrated Airports (as discussed in Section 3), with some hub premiums as high as 80% such as those at Pittsburgh Airport (US GAO, 1999a). Follow-on innovations such as alliances and code sharing allow Incumbents to wield considerable market dominance and maintain hub premiums. The Hub and Spoke provides a means for Incumbents to earn above industry rents and survive industry downturns and therefore is an example of an empty core solution. If the airport and airspace scarcity problems continue, it is possible that New Entrants and other competitors will be blocked from all airports, including satellite airports, and hub premiums will once again increase, allowing some airlines to once again bridge the empty core. Thus the Hub and Spoke case also supports the empty core theory.

Since demand for airports continues to exceed supply, particularly in dense urban areas, it is expected that airports will remain a key resource and Incumbents and New Entrants will continue to be able to extract above industry rents. It is expected that regulators will allocate airport real estate space among airlines to meet the national goal of the safe and efficient use of the national airport and airspace system. Because airlines are using the Hub and Spoke to charge above industry rents at key hubs and thus remain financially viable, regulators may be forced to one of the following actions:

1. Control fares where the supply and demand for airports worsen;

2. recognize the needs of the industry by allowing them to charge excessive rents during some periods to build up sufficient reserves to survive recessions or other crises; and/or
3. manage the cost of maintaining the Hub and Spoke to meet the national goal of commercial air service to all parts of the country by cross subsidizing competitive, unprofitable or less profitable long-haul routes with more profitable short-haul routes.

Therefore, due to constraints of supply and demand for airports, the free market view could never function properly in the long run and the empty core theory prevails.

If, however, free market proponents prevail in their recommendation of the removal of regulatory sunk costs, regimes, and deeply rooted institutional effects, what would be the effect of those recommendations?

Free market proponents often point to perimeter controls at La Guardia and National Airports and the fact that slots were grandfathered to Incumbents at no cost as an example of continued governmental intervention into the industry that thwarts its free market development. However, slot controls exist because of congestion problems in US urban areas, which only continue to increase in population density. The national and international airspace is interconnected, delays in one area of the country ripple everywhere. Therefore, attempts to allow for unlimited competitive entry degrade the safe and efficient use of the national airport and airspace system through overcrowding. Until new airports and

airspace infrastructure are built in these dense urban areas, slot controls and their regulatory sunk costs, regimes, and deeply rooted institutional effects will remain. Congressional action is one of the factors in these institutional effects (see Metropolitan Washington Airports Act ("The metropolitan washington airports act of 1986," 1986a) and Federal Aviation Reauthorization Act ("Faa reauthorization act of 1994," 1994)). However, since this involves the political realm and covers decades of political efforts, despite GAO and airlines' complaints, it is not obvious that the political will exists for change. Further even if Congressional action is taken, it isn't clear what effects it will have as evidenced by the removal of slot controls at JFK, La Guardia, and O'Hare Airports, which only resulted in causing the reinstatement of slot controls at not just the original airports but at an additional airport, Newark, as well.

A free market solution to the industry's problems of costs, inefficiencies, and low fares is to privatize airports and air traffic control. Opponents to a privatized FAA and air traffic control service question the wisdom of losing public control of the nation's airspace to the airline industry, which already has a propensity to discourage competition with their regional quasi-monopolies (i.e., hubs) (Sharkey, 2000). If indeed, as the researcher predicts, the imbalance in supply and demand for airports continues, then Incumbents and New Entrants will increase their regional quasi-monopolies through Hub and Spokes, and the ability to extend airlines' vertical control to a privatized FAA, air traffic control service, airports, and national airspace will undoubtedly be the next Hub and

Spoke follow-on innovation. Thus these actions would further concentrate the industry and discourage competition.

As part of the move to further deregulate the airline industry, Midway Airport, hub for Southwest, will be privately operated under a 99-year lease to Midway Investment and Development Company, subject to the Chicago City Council and FAA's approval (Saulny, 2008). Clifford Winston, an aviation expert at the Brookings Institution and a free-market proponent sees the Midway Airport experiment as a tiny step in overcoming "the vast inefficiencies of the public sector airports (Saulny, 2008, p. A16). In contrast, Aaron J. Gellman, a professor at Northwest University's Transportation Center and the Kellogg School of Management, said "... I don't see where the investor can benefit without raising the costs I'm going to have to pay (Saulny, 2008, p. A16). Someone will have to pay Midway Investment and Development Company for the \$2.52 billion they paid for the rights to Midway Airport. How this airport privatization experiment plays out is unknown at this time, especially as it relates to the airport authority's (now Midway Investment and Development Company) ability to expand capacity at this landlocked airport located within dense city confines and the lack of adequate runway space to meet the FAA's minimum requirements.

A privatized FAA's primary goal would be profit while the primary goal of airports, owned by municipal and state governments, is to provide their communities and businesses with scheduled air services. These two goals can be inherently contradictory. Further, if airports are privatized and an airport owner

has many airports, in an economic contraction which airport will survive? Who will guarantee commercial air service to smaller communities, a primary goal of the FAA? Will there be a limitation of foreign ownership as was the case made for US shipping ports?

Free market proponents suggest removing airport controls on funding and leases to allow the market to function more completely. In reality, funding requirements and decreasing federal funds make it difficult for airports to operate in the free market at all. Airport funding remains reliant on Incumbents' approval because they must pay for debt obligations under Residual Leases. Incumbents not only pay for airport improvements and operating costs, but provide thousands of jobs to the community. Bond markets exacerbate the funding problem by insisting that Incumbents approve PFC projects in the event there is a shortfall of PFC funds thus continuing to conflate the financial health of the airline with the health of the airport. This bond market policy is not expected to be reversed due to liquidity problems in the credit markets and the 2008 recession.

Despite free market proponents' desire to reduce airports' noise and environmental obligations, the general population's hostility to airport expansions and new airports is expected to continue, if not increase. Communities and public officials use lawsuits and political power to fight airport expansions (e.g., proposed runway in San Francisco Bay for San Francisco Airport), conversion of military airports to commercial use (e.g., Moffett Field in Silicon Valley), and

changes to the national airspace (e.g., Airspace Redesign Project over New York/New Jersey/Philadelphia).

There continues to be distortions in the US market created by Hub and Spoke barriers. There are areas of high fares and others with competitive fares, that is areas controlled by Incumbents and others controlled by Southwest and low-cost New Entrants. These barriers have been reduced as New Entrants enter hub fortresses. However, even Southwest and JetBlue find themselves constrained by low fares relative to cost and are therefore unable to earn reasonable profits. Thus, JetBlue sought capital from Lufthansa in exchange for a 19.8% ownership, and Southwest asked for voluntary layoffs to reduce labor costs, earned more from fuel hedging than its airline operations, and is seeking higher paying business customers. If Southwest and low-cost New Entrants are unable to make profits in the core airline business, how is any airline able to survive the empty core?

The government has raised concerns that Southwest would become a monopolist (US DOT, 1993). As a monopolist it would threaten free markets and antitrust regulatory action would be required to ensure that Southwest did not charge above industry rents nor become such a formidable competitor as to block other New Entrants. Indeed as additional New Entrants enter bankruptcy, Aloha Air, Air Midwest, ATA, BigSky, Champion, and Skybuss Airlines in the first half of 2008, the opportunity for New Entrants to place competitive pressures on Southwest diminishes, adding further credence to the inability of New Entrants to

survive in the long term due to the empty core, and to fears that Southwest will become the next monopolist-like Incumbent. As Incumbents lose their hub premiums on short routes to Southwest and other low-cost New Entrants and continue to compete on long-haul routes at prices too low relative to cost (US DOT, 1993), and New Entrants fail to thrive in an empty core environment, will we be a nation of one or two mega airlines (e.g., Southwest and one of the strong foreign alliances such as American - British Airways or United – Lufthansa)? How could the free market possibly survive in an environment controlled by one or two mega airlines, with the inability of New Entrants to survive in the long run?

Thus, we see three pieces of evidence that support the empty core theory in the airline industry: Industry Economics, the CRS case, and the Hub and Spoke case. We also see that, should the free market suggestions be implemented, they would only exacerbate the current industry problems and fail to achieve their stated goals.

The empty core theory makes several suggestions as to how the industry should move forward.

1. The entire industry should be regulated so airlines and their stockholders can earn a reasonable rate of return including the cost of capital (i.e., airplanes, airports, and national airspace infrastructure), if the current method of paying for them continues.

2. A more equitable means of dividing costs between airlines, both Incumbents and New Entrants, and general aviation for airport and airspace improvements and expansions is needed.
3. Policies at already congested airports and airspace must be devised that allow for the efficient and safe movement of passengers and goods without disrupting the national and international airspace and without limiting smaller communities' access to major metropolitan areas.
4. Fares must be monitored such that excessive fares are not charged, but sufficient earnings allowed for the industry and individual airlines to survive the empty core during the inevitable recessions and other crises such as terrorist attacks, wars, and high fuel prices.
5. To prevent the domination of regions and major metropolitan areas, especially at slot-controlled airports, plans must be made for infrastructure growth so that excessive fares are moderated and anticipated growth accommodated, both domestically and internationally.

Lastly, consideration must be given to long-term transportation infrastructure, as suggested by the GAO (2005b), which includes alternative modes such as bus and rail connections. These alternatives may reduce airport and airspace congestion by making it more convenient for passengers to use busses and railroads on short-distance trips, freeing up airports and airspace for long-distance flights. Such alternatives are being considered on a local basis, as is the case currently in California where there is a proposed high speed rail

project between Northern and Southern California with this very goal. It would also allow alternative transportation systems to evolve so that the US is not so heavily dependent on only one transportation mode, especially with concerns of security, high fuel costs (air transportation being the most fuel inefficient), global warming, and general transit diversification.

Social Good

Underlying this thesis is the question of whether the US needs a viable airline industry and in what form, be that US airlines, foreign airlines, free-market led industry, subsidized industry, or some combination of them all. Not only does the airline industry represent a large component of the GDP, but it plays an essential role for American business, government, and communities that cannot be quantified. However, the need for an airline industry must be balanced against the cost of keeping it viable, with due consideration to all of the issues of national defense, economic prosperity, service for the entire nation, the environment, legacy costs, safety, antitrust, and the role of free markets and the empty core. A summary of the issues follows.

National Defense

A symbiotic relationship exists between the military and the airline industry. First, the government can press private airlines into service during times of war or disaster, as was the case in World War II. Second, government costs are reduced by the use of airplanes, equipment, and personnel by private airlines

during times of peace. Third, the military trains pilots and mechanics who then transition to airline industry jobs, benefiting both. Fourth, because of the cyclical nature of the airline industry and therefore of their airplane purchases, government airplane purchases balance out the cycle for manufacturers while a healthy airline industry aids airplane manufacturers by buying airplanes. Fifth, the airline industry supports on-going airplane R&D. In the midst of this relationship between the military and the airline industry, national defense as a whole must be considered. Following the 9/11 terrorist attacks, the government, because of its relationship with the airlines, could and did raise airline security standards, often to higher levels than foreign airlines and countries. This act of national defense would not necessarily have been possible if the airlines had been under foreign control. Given these factors, the argument that having a national airline industry contributes to national security continues to be a strong one.

Economic Prosperity

US airlines are indirectly responsible for 10% of the GDP (Flint, 2001) and directly responsible for 17% of total spending by all forms of government on transportation infrastructure and services (Winston, 1999). The importance of the airline industry and the impact of airline disruptions on the economy are immeasurable. The use of airlines for just-in-time delivery and as part of the supply chain allows businesses to reduce their inventories to better manage their finances. However, proving that the ripples go both ways, when the airlines experienced uncertainties, American businesses felt it. Former Federal Reserve

Chairman Alan Greenspan (2007, p. 6) was surprised by how quickly businesses were affected after the 9/11 terrorist attacks: "The shutdown of the airspace and the tightening of borders led to shortages, bottlenecks, and canceled shifts."

Reliance on foreign airlines is fine under normal conditions, however, when recessions or crises strike, business risks and uncertainty increase. Can such a core piece of American business be entrusted to foreign control?

Under the empty core, the industry is consolidating. Conditions of free markets and antitrust require that even the few remaining airlines request subsidies to survive the empty core. As US airlines disappear, would a remaining airline under foreign control and utilizing foreign subsidies use key resources for the US? It is highly doubtful. Thus, how will American business and government manage economic prosperity without control over this key resource?

Air Service to Small Cities and Isolated Areas

EASP provides subsidized air service to small cities and isolated locations under the Deregulation Act. After the 9/11 terrorist attacks, smaller cities lost air service (Koeppel, 2003), despite the subsidies. GAO studies (2006) found it unprofitable for airlines to continue to provide small city service and recommended an expansion of EASP. However, high fuel prices still make such flights unprofitable despite an EASP subsidy (Maynard, 2008a)(5/21). At the same time, due to the importance of airline services, communities fear the loss of air service will make them unattractive to new businesses (Koenig, 2008a) as well as limit the mobility of their residents. In this situation, and given the

pressures of the free market on the airline industry, it is possible to envision small cities continuing to receive subsidized EASP service from small local airlines, while the rest of the nation is served by foreign airlines.

When airlines go bankrupt or merge, communities are justifiably concerned about losing air service and covering airport operating costs and debt service. Therefore political, business, and community pressure is applied to airlines to continue service, despite economics. For example in 2008, ATA and Aloha Airlines, both major airlines with service to the Hawaiian Islands, declared bankruptcy and the Hawaiian government exerted efforts to ensure that Aloha Airlines continued critical freight service. In a recession or crisis, why should a foreign airline provide service to US communities when it has a vested interest in providing service to its native country?

Energy and Greenhouse Emissions

In an energy-constrained world, Incumbents have old fleets, with the age of the airplanes averaging 15 to 35 years (Bailey, 2007a). These companies continue to lack capital to buy new airplanes. Even so, new airplanes still use more fuel and produce more greenhouse gases than other transportation modes. To address concerns about global warming, the EU and other nations are considering caps on airline emissions (Kanter, 2007). The EU, China, and Japan have extensive high speed rail lines which are far less polluting and provide transportation throughout the countries. This is in sharp contrast to the US where the GAO (2005b) noted that there are fewer transportation alternatives than in

EU countries. US passengers use cars to get to airports and their ultimate destinations while EU passengers use busses and trains. More importantly, EU passengers rely on government subsidized busses and trains for short-distance trips while US passengers rely on airplanes regardless of distance. This increases congestion at US airports and in the airspace and continues reliance on two fuel-inefficient modes: cars and airplanes.

While GAO (2005b) acknowledged the advantages of the EU transportation system, they felt it was too expensive for the US to develop a similar infrastructure. The US currently provides minimal support for Amtrak, the national rail service, which is unreliable due to rail congestion (Tarm, 2008). Throughout the US bus service coverage has declined because, with various low-cost New Entrants, it is cheaper to fly than use a bus. With the state of these two transportation options suboptimal, it would be a monumental political and financial task to support an EU-like system. In fact, the GAO (2006, p. 36) said if the airline industry were re-regulated and fares rose, "shift[ing] some of the nation's 670 million ... passengers to other modes of transportation ... [that] are neither as safe nor as efficient as air travel ... [would require] considerable infrastructure investment."

Airport and Airspace Congestion and Infrastructure

Demand for airports exceeds supply. Environmental concerns make it difficult to build new airports, expand existing ones, convert military airports to

civilian use, or redesign airspace. Air traffic is expected to triple by 2025 for three reasons. First is a continued increase in demand. Second, the use of regional, private, corporate, and very-light jets and air taxis is expected to rise. Lastly, there is a predicted increase in the use of small airports that impact busy airspace, such as DeKalb Peachtree, a local airport, in the Atlanta airspace, the busiest airspace in the country. Congestion at airports and in the local airspace creates delays in the national and international airspace. The FAA proposes auctioning slots, a free market solution, flying airplanes closer together, adding satellite technology and Next Generation Air Transportation, an airspace control system, and building light-embedded runways, technological advances, to increase the number of airplanes that the airspace can support. Without antitrust immunity, communities, airport authorities, and airlines cannot discuss congestion issues. Therefore, the federal government is the only entity that can make decisions on congestion solutions, allocate scarce airport and airspace resources, and provide a vision for the future, with commensurate federal funding for infrastructure, including fuel-efficient alternatives to air transport.

Legacy Costs

Incumbents provide health and pension benefits to their employees — these are crippling legacy costs. For most New Entrants these costs are comparatively low due to the fact that New Entrants don't offer them to employees. When Incumbents evolved from the 1930s - 1950s, all large corporations offered a defined pension plan, which provided employees with a

guaranteed pension as long as they remained employees for a certain period. In contrast, when New Entrants entered the industry or became subject to CAB oversight, voluntary 401K pension plans were offered in lieu of defined pension plans. The value of a defined pension plan is of greater benefit to employees, and carries a greater cost than voluntary 401Ks. Foreign airlines do not have these costs at all, they are paid for by their governments. Incumbents are attempting to jettison these costs as United did with its pensions in bankruptcy.

Another legacy cost which impacts Incumbents more than New Entrants is airport and airspace infrastructure expenses that are paid through airport Residual Leases held by each Incumbent. When airline credit declines, infrastructure costs increase. Also, because airport fees are divided among the airlines operating at a given airport, as more airlines leave airports, the fees must be spread over fewer and fewer airlines when they can ill afford it. At the same time that airlines have less money, airports receive less PFC funding as passenger demand declines. The ability of airport authorities to fund airport expansions is reduced as airlines veto projects, abandon airports, and try to survive the next six months (Koenig, 2008a).

Safety

A financially strapped industry cannot maintain safety standards. In response to financial pressures, airlines outsource airplane maintenance and the FAA lags in certifying US and foreign facilities (Sharkey, 2008a), thus leaving passengers less protected. Southwest was fined \$10.2 million for flying airplanes

that needed inspection (Wald, 2008a) while American, Delta, United, and US Airways grounded airplanes in need of inspection (Sharkey, 2008a).

Compounding this is the older fleets of US Incumbents, which require more maintenance. Overall, safety, once a sacred cow of the airline industry, is now being sacrificed as airlines try to survive (Sharkey, 2008a). Simultaneously, FAA funding has not kept up with the needs of the industry and a collaborative culture, counter to the FAA's watchdog role, has evolved. An inspector was accused of trying to "bankrupt" an airline by requesting an overhaul of life vests (Hughes, 2008) and Southwest's airworthiness compliance system was last audited nine years ago (Wald, 2008b).

Personnel issues are safety issues. NT&SB found pilot fatigue to be responsible for a 2007 accident at Traverse City, MI and one factor in a 2004 Missouri crash (Wald, 2008c). Some pilots have complained that since 2001, airlines make them fly more hours, which leaves them tired more often (Wald, 2008c). Despite this, airlines have resisted proposed 1995 FAA rules on flight and duty times because of costs.

North America has the world's lowest airplane accident rate, which regulators worldwide say is due to the FAA's oversight (Clark & Timmons, 2008). Without a significant airline industry, would the FAA continue to maintain staff and expertise to enforce safety standards and meet challenges brought on by an aging fleet and on-going cost-cutting by airlines? Will the FAA, in the face of free markets and unlimited entry, keep up with New Entrants who purchase older

airplanes and fly with less experienced pilots? In the absence of a national airline industry, what will be the role of the FAA, if any? Will they be able to keep passengers safe?

Antitrust

As discussed in previous chapters, the US airline industry is an oligopoly, that is, it is an industry made up of very few players, and like all oligopolies it is plagued by antitrust issues. Antitrust concerns and a need to stop monopoly power force regulators to diffuse radical innovations, contrary to free market ideas. Radical innovations and the innovators will always attract antitrust attention. This diffusion of radical innovations removes from airlines the tools they need to bridge the empty core and dooms the industry. Perhaps the copyright laws that protect pharmaceutical R&D provide a template. These laws give the innovator exclusive use periods but ultimately allow the innovation to diffuse and benefit the public. This remains a problematic question — who should benefit from innovations: the public, the innovator, the industry, or the stockholder? Where do antitrust concerns fit in, if at all? And, now that the airline industry has very large airlines (or mega airlines), the question is will the antitrust regulators allow alliances and mergers to continue (i.e., Delta – Northwest - Air France; American - British Airways, Continental - United)?

Financial Viability of the Industry versus Social Good

The government selects the social good over the industry's financial viability. Low-fares were chosen as Deregulation's primary goal regardless of geography and economies to scale. Antitrust oversight has limited the above industry rents that radical innovations produce. These government actions and the crises of recessions and high fuel costs have, according to GAO (2006), forced Incumbents to use up all or nearly all of their assets as collateral, limiting future capital needs. Once closed to capital markets, the airlines cannot survive. GAO (2006) concluded that the industry is under severe financial stress and that Incumbents needed to cut costs to remain competitive, despite the fact that most Incumbents had already reduced their costs below even those of Southwest in the early 2000s bankruptcies.

The liquidity crisis, high fuel prices, and 2008 recession raise the prospect of a complete US airline industry failure. Ray Neidl, an analyst with Calyon Securities, reports that the US airline industry situation is worse in 2008 than it was after the 9/11 terrorist attacks in 2001 (Koenig, 2008b). Herb Kelleher, the cofounder of Southwest, said that flying could become something that only business travelers or the affluent can afford (Koenig, 2008b). While one of Deregulation's goals was a financially healthy industry, this goal was subsumed under the pressure for low fares. In order to balance these competing goals, passengers must pay enough for scheduled air service to provide the industry

with sufficient profits that they can use to cover financial losses from inevitable recessions and crises and allow stockholders a return on their investments.

And the question is: Is the industry's social good, outlined above, significant enough to require the government to reregulate the industry to solve the empty core by ensuring sufficient profits? Or, is the pursuit of lower fares, a result of free markets and antitrust policies, a more compelling goal than the benefits provided by the industry, and thus should the free market be allowed to end the US airline industry? As we have seen, with no industry long-term profitability and equilibrium, the US airline industry will fail and be replaced by foreign airlines which are better capitalized, more fuel-efficient, and subsidized.

Contemplating the Future

The importance of the airline industry and the crisis currently facing it requires the immediate attention of policy makers and the public. This paper is not an argument for or against a particular ideology and invites scholars, policy makers, and businesses to solve the problems of a key industry. Given the findings of this thesis, I believe that while the free market view has many applications, the airline industry is not one of them. This thesis does not argue against the free market view, just its appropriate application to the correct industry based on facts. Free market thinking has opened up critical industries such as trucking, freight, telecommunications, and railroads to benefit consumers and businesses and should not be abandoned wholesale. In particular this paper

seeks the next radical innovation in policy making that will solve the airline industry's underlying economic problems.

Other areas of future research in the airline industry include:

1. Bankruptcy as a radical innovation in response to financial crises and legacy costs (e.g., pensions, health care costs) used by United to survive the empty core.
2. Fuel hedging in response to high fuel prices by Southwest to bridge the empty core. Fuel hedging locks in future fixed fuel prices (Brothers, 2008) or, in the case of Southwest, provides it with profits to cover airline operating losses.
3. Currently US airline ownership by one foreign entity is limited to 25%. What are the implications of foreign ownership of US airlines (e.g., defense, safety, economic prosperity)? Will this bring capital to ailing US airlines? An expansion of Open Skies agreements will allow foreign airlines to fly domestic US routes. Would this policy expansion address the question raised by Bennett and Craun (US DOT, 1993), "Whom will control the monopolist, Southwest?" Undoubtedly, foreign airlines flying domestically will quicken the pace of the demise of US airlines and may make the transition to foreign ownership more efficient.
4. How best can US transportation requirements be met? Should the US build a transportation infrastructure mode that is similar to the EU's and allows short-distance travel to be completed on bus or rail while long-

distance travel is by air? This will not only reduce increasing congestion problems at airports and in airspace, but will move passengers to more energy efficient transportation modes.

5. Does the empty core apply to air transportation world wide? How can we prepare for the world's future transportation needs and a globalized world?

6. How will airport and airspace expansions be paid for if US airlines vanish or the few remaining airlines pay for more capital costs? Should these costs be switched to foreign airlines? Should infrastructure cost be paid by airlines and passengers through, for example, GARBs and PFCs, or should there be a different payment method for infrastructure that is not based in the pre-Deregulation era (e.g., Residual Leases, bond markets)?

7. The Midway Airport privatization experiment as well as similar efforts overseas may provide evidence as to the ability of the airlines to discourage competition with their regional quasi-monopolies (i.e., vertical integration by controlling airport ownership); resolve the conflict between the private interest (i.e., profit) versus the public interest (i.e., reliable, frequent, scheduled commercial air service to the community); provide needed infrastructure to a capital constrained system; and see if the private interest is more effective in resolving airport and airspace congestion problems (e.g., runways with insufficient safety margins, airports located in dense urban areas, environmental issues).

8. Because it is uneconomical for any airline, domestic or foreign, to fly to small cities and isolated areas, must the US continue EASP if it maintains a policy of providing scheduled commercial air service to all parts of the country regardless of cost? EASP contingency plans are needed in the event crises (e.g., recessions, high fuel prices and shortages) cause foreign airlines to contract services so that the entire US can continue to receive airline services. As it is, the current EASP subsidy is insufficient in today's high fuel prices and small cities are losing service.

The Airline Deregulation Act of 1978 is held out as the "gold standard" of deregulation. Based on the findings of this research, the Airline Deregulation Act has failed and should not be used as such. In fact, further research is needed to determine which industries are best viewed under the free market view and which industries are best viewed under the empty core theory. Other areas of research should be those industries considered "natural monopolies," such as public utilities.

Consideration must be paid to institutional barriers to change as was discussed in Section 3 and in the GCSB Framework. Whatever policy work is undertaken for the airline industry or, for that matter any industry, the basic economic fundamentals of the industry must be understood, as well as the role of free markets and radical innovations, and the effects of antitrust confiscation of innovator's profits. Lastly, deeply rooted institutional limitations and any resistance to change must be taken into account, including the role of outsiders

in unleashing radical innovations. Without these understandings, the unintended consequences of policy actions often do more harm than good or have perverse effects. A whole body of research can be undertaken in this fertile area.

Conclusion

This thesis attempts to determine if the empty core exists in the airline industry, and if so, can radical innovations bridge the empty core? The Industry Economics chapter provides compelling quantitative data as to the state of the industry, using P&L, debt ratios, and EVAs. The conclusions of the industry economics chapter are:

1. The empty core most likely exists because the industry is unable to create sufficient reserves to manage through the business cycle;
2. the industry is unable to achieve equilibrium between costs and revenues because of unlimited competitive entry; and
3. is unable to decrease production during periods of low demand because of high fixed costs.

The CRS case study investigates the CRS as a radical innovation and the ability of American to innovate out of the empty core. While American may have been able to innovate out of the empty core, particularly when it attempted to change its core strategy to become an information management company, a relentless antitrust spotlight, stakeholder pressure, and the devastating events of the 9/11 terrorist attacks, the 2001 recession, and Gulf War II coupled with high

oil prices, forced the company to jettison its CRS and return to an airline-only strategy.

The Hub and Spoke case study investigates the Hub and Spoke as a radical innovation and recognizes its creation as a key resource due to an imbalance in airport supply and demand. More importantly, the Hub and Spoke case investigates the deep institutional complexity in which airports are situated, leading to the inability to effectuate change and the continued imbalance in airport supply and demand. Due to this imbalance, airlines can maintain airports (whether Hub and Spoke or satellite airports) as key resources and enjoy the benefits of blocked competitive entry and above industry rents. This is particularly true at the slot- and perimeter-controlled airports: JFK, La Guardia, National, Newark, and O'Hare. However, again, because of unrelenting antitrust pressures, it is uncertain for how long airlines will be able to bridge the empty core using this radical innovation.

It is now for policy makers and the public to decide the form of airline service they wish for this country: a free market system leading to an empty core or varying degrees of reregulation. The obvious consumer benefit of low fares and frequent service has been achieved by the Deregulation Act of 1978. However, the health of US airlines is so diminished that their ability to survive is highly unlikely. The benefit of low fares and frequent service was taken from the airline industry's workers (wages and pensions), from their investors (high debt ratios and bankruptcies), and from taxpayers (subsidies).

If we choose not to have a US airline industry, then issues of national security, economic prosperity, safety, environment, energy, airport and airspace infrastructure, and antitrust must be discussed. However, if the American public and policy makers don't have that discussion but allow the status quo to continue, the empty core will eliminate the US airline industry. If, on the other hand, the American public and policy makers choose a viable US airline industry, they must make the hard decisions as to how to reregulate the industry. We have already seen how government efforts to deregulate the industry had unexpected consequences and the effect of deep institutional resistance to change. This will not be an easy task.

This thesis has identified a significant challenge to the US. If the airline industry cannot access capital it will fail. If the industry is in an endless cycle of bankruptcy, no investor will lend it capital. Yet, if reregulation is the answer for the industry, for those of us who are free market thinkers, to squash radical innovation by regulatory and antitrust efforts and lose the efficiencies and creativity brought by innovation is too hard to bear. The conundrum caused by free markets and radical innovation with antitrust profit confiscation is even more unbearable. It is my expectation that the next radical innovation will be a policy one that will meet the requirement of industry financial stability, breach the empty core, and let radical innovations benefit the innovator.

It is not my place to answer these policy questions. I did not start out this thesis to even raise the question of the industry's survival via the empty core.

Rather, I began this thesis to ask whether crises provoke innovations, and in particular radical innovations. I did not expect to find the dire condition of the airline industry. And, it is not just the US airline industry — the empty core scenario can easily be extended to foreign airlines as deregulation is extended abroad. It is hard to ignore what happened to the Canadian airline industry: every airline has gone bankrupt. However, as a member of the business community, I urge the American public and policy makers to undertake this serious discussion. I would not want to imagine a world without a reliable, safe, airline system at reasonable (not cheap) fares that is unable to benefit from radical innovations.

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APPENDIX A

ABBREVIATIONS AND GLOSSARY

AC	Average cost
AC*	Optimal average cost
Agent	Travel agent, who provides travel services such as airline reservations and ticketing
Airport Authority	Municipal, city, state, quasi-government, and/or private entity that owns or manages an airport. The airport authority may lease out portions of the airport to private interests (e.g., parking, retail).
Airport Controlled Real Estate	Real estate, such as gates and ticket counters, that is owned and controlled by airport authorities. This real estate is then rented to New Entrants for short terms. This sort of real estate is different from the long-term exclusive use real estate that airport authorities rent to Incumbents and Majors. (See Exclusive Use Clause.)
AIP	Airport Improvement Program
Airspace Redesign Project	NY/NJ/Philadelphia Metropolitan Area Airspace Redesign Project
AirTran	AirTran Airways
Alaska	Alaska Airlines

Alliance	Agreement between two or more airlines that ranges from an interline agreement, code sharing, or franchise arrangement to a full merger. Some international alliances include antitrust immunity. (See Code Sharing and Interlining.)
America West	America West Airlines
American	American Airlines, Inc.
ATA	American Trans Air
AT&T	American Telephone & Telegraph
Atlanta Airport	Hartsfield Atlanta International Airport, Atlanta, GA
Baltimore Airport	Baltimore-Washington International Airport, Baltimore, MD
Bandwagon Effect	The phenomenon by which competitors adopt the innovations of industry leaders out of fear of possible underperformance relative to the industry average if the innovation is not adopted (Aldrich & Fiol, 1994).
Boston Airport	Boston Logan International Airport, Boston, MA
Bracket	A strategy used by Incumbents to discourage a New Entrant's entry into a new market. The Incumbent provides many flights around the proposed New Entrant's flights, encouraging customers to choose the Incumbent's more frequent flights. The New

	Entrant, lacking sufficient passenger load to maintain its flight schedule, drops out of the market. Normally, after this strategy is successful, the Incumbent returns to its normal schedule.
Braniff	Braniff International, the original airline, liquidated
Braniff II	A subsequent Braniff airline, unrelated to the original one
Brooke Standard	US Supreme Court standard for predation, established in Brooke Group Ltd. v. Brown & Williamson Tobacco Corp. (509 U.S. 209)
Burbank Airport	Burbank-Glendale-Pasadena Airport, Burbank, CA
CAB	Civil Aviation Board
Charlotte Airport	Charlotte/Douglas International Airport, Charlotte, NC
Cincinnati Airport	Greater Cincinnati International Airport, Cincinnati, OH
Code Sharing	Two airlines sharing the same FAA-designated flight code to book passengers, thus taking advantage of coordinated passenger and baggage check-in, schedules, standards of service, and FFPs. May include selling of each other's seats and TACOs. Cost and revenues are shared between the airlines. (See Appendix F.)

Co-Host Status	The title given to a smaller, partner airline that is sharing the CRS of a larger airline, often being charged lower or no fees. The smaller airline benefits from increased marketing, revenues, CRS branding, and traffic while the larger airline gains passenger feed from smaller towns at lower costs. Co-host status was outlawed under the CRS Rules of 1984.
Compensatory Lease	An airport lease where the airport authority assumes financial risk and rewards of airport operations, including debt service for capital improvements
Concentrated Airport	An airport where either one airline handles at least 60% of enplaning passengers or two airlines handle at least 85% of enplaning passengers. Airport may also be a hub airport (US GAO, 1990a).
Continental	Continental Air Lines, Inc.
CRS	Computer Reservation Systems, later named Global Distribution System (GDS). Computer system to track fares, flight information, reservations, tickets, and passenger-name-records (PNR).
D	Demand
Dallas Airport	Dallas-Ft. Worth International Airport, Dallas, TX

Debt to Capital Ratio	Long-term debt of a company, excluding current, short-term debt, divided by the total invested capital (Standard & Poor's, 1986).
Delta	Delta Air Lines, Inc.
Denver Airport	Stapleton International Airport, Denver, CO; later relocated to Denver International Airport
Deregulation	Airline Deregulation Act of 1978
Detroit Airport	Detroit Metro Wayne County Airport, Detroit, MI
DOJ	Department of Justice
Dominant Airline	An airline that has a significant market share at an airport, whether a slot-controlled or Concentrated Airport. (See Concentrated Airport and Slot-Controlled Airport.)
DOT	Department of Transportation
Dulles Airport	Washington Dulles International Airport, Washington, DC/VA
Duopoly	A market power situation in which two competing sellers hold the controlling power of determining the amount and price of a product or service offered to a large number of buyers (Merriam Company, 1961, p. 702)
E-Ticket	Electronic ticket

EASP	Essential Air Service Program
Eastern	Eastern Air Lines
Empty Core Theory	An economic theory that holds that the nature of a given industry is such that there is no equilibrium between the price of goods sold and the cost of goods produced at which any providers can survive over the long run (Telser, 1978)
Enplanement	Passenger entering or exiting an airplane to depart to another city or locale.
EPA	Environmental Protection Agency
Essential Facilities Doctrine	A facility a company must use in order to customers. Airports, for example, are essential facilities that must be used to access the national airspace.
EU	European Union
EVA	Economic Value Added. The net operating profit after taxes less a charge for the capital employed to produce those profits. The capital charge is the required, or minimum, rate of return necessary to compensate all the firms' investors, debt holders as well as shareholders, for the risk of the investment (Stern et al., 1995, p. 40).

Exclusive Use Clause	A lease clause that allows an airline to control the leased airport real estate exclusively, even when that real estate is not currently being used.
FAA	Federal Aviation Administration
Feeder Airline	Smaller airline that supports a larger airline by feeding passengers to the larger airline's Hub and Spoke. Feeder airline may or may not be owned by the larger airline. (See Appendix D.)
FFP	Frequent Flier Program. A marketing program that rewards travelers who frequently use a particular airline. It encourages passengers to use one airline over another. Offered rewards can include upgrades to business or first class and free tickets.
Follow-On Innovation	Future technologies, products, and services generated by a radical innovation (Rosenkopf & Nerkar, 2001; Trajtenberg, 1990).
Free Market View	An economic theory that holds that the market should determine price and profits and that unlimited competitive entry eliminates weak competitors and produces a more robust industry.
GAO	General Accounting Office, later called Government Accountability Office

GAAP	Generally Accepted Accounting Principles
GARB	General Airport Revenue Bond. A bond issued to raise money for the construction or renovation of an airport. Generally, these are tax free municipal bonds, whose interest rate is based on the creditworthiness of its largest airline tenant(s), who in turn have signed a long-term lease(s) (often a Residual Lease with a Majority-In-Interest clause).
GDP	Gross Domestic Product
GDS	Global Distribution System
Guide	Airline Tariff Publishing Company's Guide
GCSB Framework	George, Chattopadhyay, Sitkin, and Barden Framework. A decision matrix that explains how patterns of institutional persistence and change depend on whether decision makers view environmental shifts as opportunities for, or threats to, legitimacy, and ultimately, resources (George et al., 2006)
Houston Hobby Airport	William Hobby Airport, Houston, TX
Houston Intercontinental Airport	Houston Intercontinental Airport, later named Houston Bush Intercontinental Airport, Houston, TX

Hub Airport	Airport where one or two airlines have a dominant presence with many scheduled flights and a large amount of leased airport real estate such as maintenance areas, staff areas, and hangars.
Hub and Spoke	A logistical transportation system in which a number of feeder routes connect to a central hub. There passengers can be collected from feeder flights, transferred to other flights, and carried to their ultimate destination on the same airline. (Standard & Poor's, 1983, p. A32) (See Point-to-Point.)
Hybrid Lease	A cost approach airport lease where the airport authority assumes the financial risks and rewards of some airport operations, such as retail, while the airline(s) assumes other cost obligations
Incremental Innovation	Innovation that alters the trajectory of a radical innovation, but not in a frame breaking way
Incumbent	Major airline that existed prior to Deregulation and was subject to CAB regulation
Interlining	An old practice of transporting passengers on two or more unrelated airlines in some agreed upon sharing arrangement of costs and revenues. (See Code Sharing and Feeder Airlines.)

Isomorphic Response	A response consistent with the responses of other legitimate actors in the industry (George et al., 2006, p. 348). (See Nonisomorphic Response.)
JetBlue	JetBlue Airways
JFK Airport	John F. Kennedy International Airport, New York, NY, a slot-controlled airport
Key Resource	Resource that is rare, valuable, has few substitutes, and is difficult to imitate (Barney, 1991), and can be used to gain sustainable competitive advantage (Penrose, 1959; Wernerfelt, 1984). Examples include patents, airport leases, and landing slots.
KLM	KLM Royal Dutch Airlines
La Guardia Airport	La Guardia Airport, New York, NY, a slot- and perimeter-controlled airport
Legitimacy	A generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions (Suchman, 1995, p. 574).
LIFO	Last In, First Out; an inventory accounting method
Long Beach Airport	Long Beach/Daugherty Field, Long Beach, CA
Los Angeles Airport	Los Angeles International Airport, Los Angeles, CA

Love Field Airport	Love Field Airport, Dallas, TX, a perimeter-controlled airport
Low-Cost Airline	An airline that uses low-cost fares as a key strategy. The prime example is Southwest. Low-cost fares can also be part of Incumbents' subsidiaries' strategy, such as United's Ted or US Airways' Metrojet, or they can be the re-defined strategy of Incumbent (e.g., Braniff before bankruptcy).
MC	Marginal Cost
MR	Marginal Revenue
Major	Defined by DOT as airline earning annual revenues greater than \$1 billion
Memphis Airport	Memphis International Airport, Memphis, TN
Miami Airport	Miami International Airport, Miami, FL
Midway Airport	Midway Airport, Chicago, IL
Midway-Southwest	Midway (Southwest) Airway Co., a subsidiary of Southwest Airlines Co.
MII	Majority-In-Interest lease clause which gives signatory airline the right to approve capital projects
Mimetic Innovation	Copycat innovation; response to industry leaders and stakeholder pressures to respond to a crisis with an innovation.

Minneapolis Airport	Minneapolis/St. Paul International Airport, Minneapolis, MN
Monopoly	Ownership or control that permits domination of the means of production or the market in a business ... usually for controlling prices and that is achieved through an exclusive legal privilege ... or by control of the source supply (Merriam Company, 1961, p. 1463).
Muse	Muse Air
Nashville Airport	Nashville Metropolitan Airport, Nashville, TN
National	Defined by DOT as any airline earning revenues between \$100 million and \$1 billion/year.
National Airport	National Airport, Washington, DC's; later named Ronald Regan Washington National Airport, a slot- and perimeter-controlled airport
Natural Monopoly	Industry in which competition is not expected to be feasible; when the minimum average cost of production occurs at a rate of output generally sufficient to supply the entire market. If two firms split the market, each would be smaller than its optimally efficient size and each would have relatively high costs and an incentive to expand output. If both lower prices to sell more, price will generally fall faster than

average cost because a large portion of production costs in these industries is fixed, and competition becomes ruinous. Ultimately, only one firm can survive in such a market. Virtually all public utilities are natural monopolies (US GAO, 1990a).

New Entrant	Airline that was either a new airline post-Deregulation or was an intrastate, regional, air taxi, commuter, or other airline that existed pre-Deregulation, but was not subject to CAB oversight.
New Orleans Airport	New Orleans International Airport, New Orleans, LA
Newark Airport	Newark Liberty International Airport, Newark, NJ, a slot-controlled airport (1969-1970; 2008 - present)
Nonisomorphic Response	A response that departs from what is considered legitimate in the industry (George et al., 2006, p. 348). (See Isomorphic Response.)
Non-Signatory Lessee	A smaller lessee of an airport who occupies less space than a Signatory Lessee. They may be a sublessee, who subleases the space from a lessee, or an entity who rents the space for a very short time (i.e., 1 - 30 days). (See Signatory Lessee.)
Norfolk Airport	Norfolk International Airport, Norfolk, VA
Northwest	Northwest Airlines

Northwest and Continental v. American et al. (1992)	Northwest Airlines, Inc. v. American Airlines, Inc. (1992) and Continental Airlines, Inc. v. American Airlines, Inc. and AMR Corp., (1992), consolidated in District Court
NT&SB	National Transportation and Safety Board, later named National Transportation Safety Board
O'Hare Airport	O'Hare International Airport, Chicago, IL, a slot-controlled airport
Oakland Airport	Oakland International Airport, Oakland, CA
Oligopoly	Market situation in which each of a limited number of producers is strong enough to influence the market but not strong enough to disregard the reaction of his/her competitors (Merriam Company, 1961, p. 1572).
OPEC	Organization of Petroleum Exporting Countries
Open Skies Agreement	Agreement between governments that allows airlines to gain greater flying rights and set fares in each other's country.
P*	Optimal price
P&L	Profit and Loss
Pan Am	Pan American World Airways
PARS	Programmed Airline Reservation System; TWA's CRS

PATCO strike	Air traffic controllers' strike by the Professional Air Traffic Controllers Organization
PATH	Port Authority of New York and New Jersey, responsible for JFK, La Guardia, and Newark Airports
PBGC	Pension Benefit Guaranty Corp.
People	People Express
Perimeter-Controlled Airport	<p>An airport where flights to and from are limited by distance, geographic area, and/or size of airplane.</p> <p>The three perimeter-controlled airports are La Guardia Airport (1,500 miles), National Airport (1,250 miles), and Love Field Airport (must first stop at an airport in Alabama, Arkansas, Kansas, Louisiana, Mississippi, New Mexico, or Oklahoma before proceeding elsewhere or flying to Love Field Airport if airplane exceeds a capacity of 56 passengers).</p>
PFC	Passenger Facility Charge. Fee charged to the passengers who use an airport. These fees may be spent by the airport authority to enhance safety or capacity, to reduce or mitigate noise, and encourage competition.
Phoenix Airport	Phoenix Sky Harbor International Airport, Phoenix, AZ

Pittsburgh Airport	Greater Pittsburgh International Airport, Pittsburgh, PA
PNR	Passenger name record, used by all airlines to track passengers' itineraries
Point-to-Point	Point-to-point route system. Route system used by airlines in which each plane flies from one city to another in a linear fashion, such as from Los Angeles, to Las Vegas, to Chicago, to Nashville, and ultimately to Providence, RI. (See Hub and Spoke.)
Predation	A competitive strategy in which an airline deliberately sets its prices below marginal cost on certain routes and carries a loss until it has driven a rival on those routes out of business, after which it again raises prices to a monopoly level (Greig, 2005). This practice discourages any future entrants because it is possible that they will also meet an aggressive response (Milgrom & Roberts, 1990).
Preferential Use Clause	Lease clause that allows any airline that has leased the real estate (e.g., gates) the right of first usage, and when not needed, to make the real estate available to other airlines.
PSA	Pacific Southwest Airlines

Q*	Optimum output
R&D	Research and Development
Radical Innovation	An innovation that fundamentally changes the technological trajectory of a given industry, is designed for new or emergent customers (Abernathy & Clark, 1985; Benner & Tushman, 2002), and provides a company with above industry rents (Harhoff et al., 1999) and follow-on innovations (Rosenkopf & Nerkar, 2001; Trajtenberg, 1990)
Raleigh Airport	Raleigh-Durham Airport, Raleigh, NC
Regional	Defined by DOT as any airline earning revenues of less than \$100 million/year.
Reno Airport	Reno/Tahoe International Airport, Reno, NV
Republic	Republic Airlines
Residual Lease	An airport lease where airline(s) assumes financial risk and rewards of airport operations, including debt service for capital improvements
Resource Based View of the Firm	Analyzes a company's resource position and determines strategic options that provide sustainable competitive advantage (Penrose, 1959; Wernerfelt, 1984)
S&P	Standard and Poor's

Sabre	Semi-Automatic Business Research Environment, American's CRS
Salt Lake Airport	Salt Lake City International Airport, Salt Lake City, UT
San Diego Airport	San Diego International – Lindbergh Field Airport, San Diego, CA
San Francisco Airport	San Francisco International Airport, San Francisco, CA
SAS	Scandinavian Airlines
SEC	Securities and Exchange Commission
Signatory Lessee	Dominant airline lessee who meets minimum operation thresholds and enjoys favorable lease terms. A Signatory Lessee has greater obligations and rights than a non-Signatory Lessee.
Slot	The assigned take off and landing times and days, limited in number. (See Slot-Controlled Airport.)
Slot-Controlled Airport	An airport that limits take offs and landings under the FAA High Density Rule of 1969 (and subsequent amendments) to limit congestion at O'Hare, National, JFK, La Guardia, and Newark Airports (the latter was decertified in 1970 and reinstated in 2008).
Southwest	Southwest Airlines Co.
St. Louis Airport	Lambert St. Louis International Airport, St. Louis, MO

Sun Jet	Sun Jet International
TAC	Texas Aeronautics Commission
TACO	Travel Agent Commission Override. A bonus commission given by an airline to Agent for booking more passengers.
Texas Air	Texas Air Corp.
Trunk Carrier	The old terminology for a major airline. (See Major.)
TWA	Trans World Airlines
Tying	A market practice in which the seller makes the purchase or use of its product by a competitor contingent on the purchase or use of another one of its products. The seller must have sufficient economic power in the market to enable it to restrain trade for the given product and a not insubstantial amount of commerce in the tied product or service is affected (US FAA/OST, 1999a). For example, if a New Entrant airline wants to rent a gate from an Incumbent, the Incumbent can "tie" ground service payments to that leased gate. Tying is illegal under the Sherman Act.
United	United Air Lines, Inc.
U.S. v. Airline Tariff Publishing Co.	U.S. v. Airline Tariff Publishing Co., Alaska Airlines, American Airlines, Continental Air

et al. (1992)	Lines, Delta Air Lines, Northwest Airlines, Trans World Airlines, United Air Lines, and USAir (1992)
U.S. v. American et al. (2000)	U.S. v. AMR Corp., American Airlines, Inc., and AMR Eagle Holding Corp. (2000)
US Airways	Also earlier named USAir
Western	Western Air Lines
Western Pacific	Western Pacific Airlines
Yield Management Software	Software that allows a company to maximize profits per passenger per flight. Historical booking patterns, competitors' prices and availability, and economic data are included in the calculations. This software allows for variable ticket pricing, and is useful in the airline industry with its perishable product.
9/11 terrorist attacks	Sept. 11, 2001 terrorist attacks on the World Trade Centers, New York, NY; The Pentagon; and a field in PA

APPENDIX B
PARTIAL LIST OF GOVERNMENT REPORTS OF COMPUTER
RESERVATION SYSTEMS

Airline Computer Reservation Systems: Hearing before the Subcommittee on Antitrust, Monopolies and Business Rights of the Committee on the Judiciary, United States Senate, 100th Cong., 1 (1987)
(incorporates testimony from various agencies)

Airline Computer Reservation Systems: Hearing before the Subcommittee on Aviation of the Committee on Public Works and Transportation, House of Representatives, 100th Cong., 2 (1988) (incorporates testimony from various agencies)

Barriers to Competition in the Airline Industry: Hearing before the Subcommittee on Aviation of the Committee on Commerce, Science, and Transportation, Senate, 101st Cong., 1 (1989)
(GAO/T-RCED 89-65)

Comments on "Airline Competition Enhancement Act of 1992:" Hearing before the Subcommittee on Aviation of the Committee on Public Works and Transportation, House, (1992) (GAO/T-RCED 92-71)

Computer Reservation Systems: Hearing before the Subcommittee on Aviation of the Committee of Commerce, Science, and

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APPENDIX C

LAWS, REGULATIONS, AND COURT CASES GOVERNING AIRPORTS

Antitrust Laws

Name	Jurisdiction	Purpose/Comments
Sherman Antitrust Act (1890), P. L. 190	Federal law	Law covering antitrust, monopolies, and predatory behaviors
Continental Airlines, Inc. v. American Airlines, Inc. and AMR Corp. Civil Action G-92-259 and Northwest Airlines v. American Airlines, Inc. Civil Action G-92-266 (SD TX) (1992)	Federal court	Continental and Northwest accuse American of predatory behavior to drive them out of business in antitrust case; American prevails
Brooke Group Ltd. v. Brown & Williamson Tobacco Corp. 509 U.S. 209 (1993)		Establishes the Brooke standard of antitrust: predation in an oligopoly, recoupment of losses via subsequent monopolization, prices below cost, and injury to competition in relevant market
U.S. v. AMR Corp., Case 99-1180 (KS, 10 th Cir.) (2001)		DOJ case against American for violation of Sherman Act, Sec 2 for predatory behavior against New Entrants at Dallas Ft. Worth Airport; American prevails
Sherman Act, Section 1 — Tying of Services	Federal law	The sale of one contract or service is conditioned on the purchase of another and seller has sufficient economic power in the market to restrain trade in the market for the tied product or service. Sublease tying practices by airlines, whether ground handling contracts or purchase of services, violates the Sherman Act.

Name	Jurisdiction	Purpose/Comments
Sherman Act, Section 1 — Exercise of Majority-In-Interest (MII) lease clause blocks capital projects		Unreasonable exercise of MII power by two or more airlines to block a capital project that will benefit a competitor without legitimate justification
Sherman Act, Section 2 — 15 U.S.C. 1 et. Seq. Essential Facilities Doctrine		Airports must make facilities available if (1) control of essential facility is by a monopolist; (2) competitor is unable practically or reasonably to duplicate the essential facility; (3) there is denial of use of the facility to a competitor; and (4) it is feasible to provide the facility to a competitor
MCI Communications Corp. v. American Telephone & Telegraph Co., 708 F. 2d 1081, 1132-33 (7 th Cir.) (1983) and Delaware & Hudson Ry v. Consolidated Rail Corp., 902 F. 2d 174, 179-180 (2d Cir.) (1990)	Federal court	These cases confirmed the Essential Facilities Doctrine. The AT&T case is the precedent-setting case, while the Delaware & Hudson case confirms the Essential Facilities Doctrine applies to the transportation industry
FAA Advisory Circular 150/5190.2A ¶7 (1972)	FAA	Prohibition of exclusive rights that limit usefulness of airports and deprive public of the benefits of a competitive airport
City of Dallas v. Southwest Airlines Co. 371 F. Supp 1015 (N.D. TX) (1973); affirmed 494 F.2d 773 (5 th Cir.), cert. denied 419 US 1079) (1974); 371 F. Supp. 1015, 1030	Federal courts, and federal law	City of Dallas unreasonably and with unjust discrimination denied Southwest access to Love Field Airport since other airlines of similar size and functions were allowed to use Love Field Airport; anti-competitive. Discrimination objectionable because of the anti-competitive effect it has on the airlines and public they serve

Name	Jurisdiction	Purpose/Comments
FAA Advisory Circular 5190.1A (1985)	FAA	Manipulating standards solely to protect the interest of an existing tenant(s) is unacceptable
49 U.S.C. 40103 (e) and 47107(a) (4); Grant Assurance 23; and 62 FR 29761 (1997)	Federal law	Airport is prohibited from granting an exclusive right to conduct a particular aeronautical activity
FAA Advisory Circular 5190.6A, ¶4-13a (1985); 49 U.S.C. 47107(a)	FAA	Airport must make reasonable efforts to accommodate New Entrants with necessary facilities; must not deny or unreasonably delay approvals, must not protect Incumbents; must not relinquish control of airports to Incumbents; and must not deny signatory status to an airline that assumes obligations established for signatory status, particularly if the ability to meet signatory status is hindered by airport policy or lack of facilities. Airports are responsible for assuring the sublease terms and conditions are reasonable and that similar users are subject to substantially comparable charges, including foreign carriers
FAA Advisory Circular 5190.6A, ¶4-13b; 49 U.S.C. 47107 (a)(2); 49 U.S.C. 47107 (a)(2)(B)		Airports must assure terms imposed, including rates and charges, are fair, reasonable, and applied without unjust discrimination. However, airports may make reasonable classifications between tenants and non-tenants and signatory and non-signatory tenants and may impose different charges, regulations, and conditions.
Midway Airlines Inc. v. County of Westchester 584 F. Supp. 436 (SDNY) (1984)	Federal court	DOT and FAA supported Midway's efforts to enter Westchester Airport, which was denied

Name	Jurisdiction	Purpose/Comments
FAA Advisory Circular 5190.6A (1989)	FAA	Airports must exercise economic non-discrimination between New Entrants and Incumbents
FAA Advisory Circular 5190.6A, ¶4-15d (1989)		Access for New Entrants must be to all facilities: parking, loading bridges, hold rooms, ticket counters, and baggage make up areas
FAA Advisory Circular 5190.6A ¶3-1		Enjoins airports from granting any special privilege or monopoly use of public airport facilities
FAA Advisory Circular 5190.6A, ¶3-9a and ¶3-9c(2); (1989)		Exclusive-use, long term leases with airlines are not prohibited as long as there is no understanding to exclude other reasonably qualified airlines. However, such leases should be limited to space "as is demonstrably needed."
FAA Advisory Circular 5190.6A, ¶3-9e(3)		Airports must assure ground handling arrangements do not hinder New Entrants or non-signatory airlines and are reasonable and non-discriminatory. However, reasonable safety standards can be imposed.
FAA Advisory Circular 5190.6A, ¶3-12		Airports may establish minimum standards to ensure safe and efficient operations as long as they are fair, uniformly applied, relevant to the proposed activity, reasonably attainable, and not unjustly discriminatory. Airports may eliminate hazards to people on ground and aircraft, but may not justify access restrictions as potential economic harm to another airport (Love Field Service Interpretation, supra, n 4)

Name	Jurisdiction	Purpose/Comments
FAA Order 1999-1 (1999); Arapahoe County Public Airport Authority v. FAA, Case 99-9508 (10 th Cir.)	FAA and Federal courts	Court ruled that a ban and delay on airline's airport access of two years is unreasonable and discriminatory
Clayton Antitrust Act of 1914; P.L. 212	Federal law	Prohibits antitrust activities as it relates to mergers, monopolies, and interstate commerce
Hart-Scott-Rodino Antitrust Improvements Act of 1976; P.L. 94-435; 15 U.S.C. 1311		Imposed waiting period for all proposed mergers

Perimeter-Controlled Airport and Antitrust

Name	Jurisdiction	Purpose/Comments
Wright Act (1980) P.L. 96-192	Federal law	Perimeter law restricting Southwest to fly from Love Field Airport to four adjacent states: AK, LA, NM, and OK
Shelby Amendment to Wright Act (1997) P.L. 105-66, 111 Stat 1425, 1447		Added additional states with direct access to Love Field Airport: AL, KS, and MS.
American Airlines, Inc. v. U. S. Department of Transportation, 202 F.3d 788 (5 th Cir.)	Federal Court	Any airline can offer service to any city from Love Field Airport with jets that carry 56 or fewer passengers.
FAA Advisory Circular 5190.6A, ¶4-8d	FAA	If authority owns a multi-airport system, they may designate certain airports for use by a particular class(es) of airplanes, but must be able to assure that all classes of aeronautical needs can be fully accommodated within the system without unreasonable penalties to any class and that it is beneficial to overall system capacity

Slot-Controlled Airports and Antitrust

Name	Jurisdiction	Purpose/Comments
High Density Rule (1969)	FAA	To control congestion at Chicago's O'Hare Airport, New York's La Guardia and JFK Airports, New Jersey's Newark Airport, and Washington DC's National Airport the number of landing and take-off slots that limited usage/hour was established. Newark Airport was removed from the list in 1970.
Airport and Airways Improvement Act (1979)	Federal law	Transportation Secretary final arbiter on airline airport access
CAB Ruling of 1979	CAB ruling (administrative law)	City of Norfolk, VA does not own slot rights to access Washington's National Airport; airlines may chose routes to slot-controlled airports under the Deregulation Act
High Density Rule Amended, 1985	FAA	Allows for slot sales, eliminates scheduling committees, grand-fathered slots to current holders, and added a "use-it or lose-it" provision
High Density Rule Amended, 1989		Allows an airline with 8 or fewer slots exemption from "use-it or lose-it" provision so long as it does not lease slots to another airline
Metropolitan Washington Airports Act (1986) 49 U.S.C. sec 49109; 14 C.F.R. sec 93.253	Federal law	Confirms 1,250 mile perimeter limit and limits number of flights per day at National Airport
Federal Aviation Reauthorization Act (1994) (49 U.S.C. sec 41714)		Allows additional slots at O'Hare, La Guardia, and JFK Airports when DOT finds it in the public interest. JFK Airport partial slot controls removed in 2007. Due to extreme congestion, DOT reinstated slot-controls at JFK and Newark Airports and proposes auctioning slots at 3 NYC area airports.

Bankruptcy Laws and Antitrust

Name	Jurisdiction	Purpose/Comments
Bankruptcy Code 11 U.S.C. 365 (d)(9)	Federal bankruptcy courts and federal law	Bankruptcy courts are required to consider the level of actual use of terminals or gates which are subject to lease by the bankrupt airline, the public interest, and the existence of competing demands for the use of such terminals or gates
Matter of Midway Airlines, Inc. 6F. 3d 4921 7 th Cir. (1993)		Bankruptcy trustee can assign gates to whomever it chooses despite protests from airport authorities seeking to give gates to New Entrants

Environmental Laws and Court Cases

Name	Jurisdiction	Purpose/Comments
Stage II Aircraft Noise Standards (1969)	FAA	Establishes requirement that older Stage I aircraft be removed from service or modified between 1981-1985
Clean Air Act (1970)	Federal law	Key environmental law enacted at federal level, and replicated at state and local levels, including application to airports
British Airways Board v. Pt. Authority of NY 564 F. 2d 1022 (2 nd Cir.) (1977)	Federal courts	Unreasonably delay by Pt. Authority due to pending noise program; airport must be demonstrably congested or there must be a significant safety, noise, or environmental concern in order to delay access
British Airways Board v. Pt. Authority of NY and NJ 558 F. 2d 75 (2 nd Cir.) (1977) & 564 F. 2d 1002 (2 nd Cir.) (1977)		Regulations on airport noise levels must be reasonable, non-arbitrary, non-discriminatory and only when justified. Pt. Authority delayed airport access when Concorde met the decibel-based noise standard
Burbank-Glendale-Pasadena Airport Authority v. Hughes Airwest (1980)	CA courts	7 airports have control over airplane noise standards; 4 airports severely limit access (Burbank, Long Beach, and Orange County); and 2 are limited by court order (Burbank and Long Beach).
Airport noise controls by other states	CO, MA, MN, NY, and TX laws	Boston, Denver, & Minneapolis Airports have noise budgets or caps; Boston & Love Field Airport require a greater portion of Stage III airplanes than industry standard; and Islip, NY limits flights 24/7.
Airport Noise and Capacity Act (1990)	Federal law	Airports may restrict Stage III airplanes to alleviate demonstrated noise and environmental impacts, subject to the FAA. No Stage II airplanes are allowed after 1999. However, such acts must be reasonably consistent with reducing non-compatibility of land uses around airport; not create undue burdens to interstate and foreign commerce; not be unjustly discriminatory; not cause unsafe or inefficient use of airspace; meet local and national air transportation needs to the extent practicable; and not adversely affect FAA laws and powers.

Passenger Facility Charges

Name	Jurisdiction	Purpose/Comments
Airport Development Acceleration Act (1973)	Federal law	Prohibition against passenger facility charges (PFC)
Airport Improvement Program Handbook, Order 5100.38A ¶ 551 (1989)	FAA	Airport Improvement Program (AIP) is limited to common-use terminal facilities (e.g., baggage claim delivery, automated handling equipment, holding areas, and loading bridges) at large and medium hubs. Ineligible projects are ticketing areas, gates, passenger check in, and large and medium hub terminal improvements.
Omnibus Budget Reconciliation Act (1990) 49 U.S.C. 40117; 14 CFR Part 158, Sec 15(a);	Federal law	Allows airports to charge PFC to preserve or enhance safety, capacity, or security of air transport system; reduce or mitigate noise impacts of airports; or furnish opportunity for enhanced competition between airlines, subject to FAA approval. PFCs are permanently authorized and not subject to re-appropriation
Part 158, Sec 25 (b)(7)		Airports are required to respond fully to any air carrier or public assertions that a PFC project is anticompetitive
49 U.S.C. § 40117(a)(3) (E)		PFCs may be used for leased gates and other areas related to passenger movements
49 U.S.C. § 40117(b)(1)		PFCs may be used to pay debt-service costs of airport projects, permitting major infrastructure projects to be built more expeditiously

Name	Jurisdiction	Purpose/Comments
PFC (55) § 40117(f)(1-3)		No contract between airport authorities and airlines may block usage of PFC
PFC (55) §40117(f)(2)		No public agency may enter into a lease of five years or more for use of space funded by PFC but can have a long-term, preferential-use lease as long as not <i>de facto</i> exclusive lease. Lease cannot have a carry-over renewal provision that would automatically extend the term of the agreement with Incumbent in preference to a potential New Entrant to airport. Airport authority may terminate lease or use agreement if airline has an exclusive lease or use agreement for existing airport facilities and any portion of facilities is not fully utilized and not made available to potential entrants.
PFC Part 158, section 15 (b)(7)		Airport authority must justify in its request for PFC funding any existing conditions that limit competition at the airport and must list any initiative it proposes that will foster competition and the expected results
Airport and Airway Safety, Capacity, Noise Improvement, and Intermodal Transport Act P.L. 102-581 (1992)		Restricts DOT's authority of PFCs. Allows AIPs for conversion of military airports to civilian airports. Reduces noise pollution at airports.
Wendell H. Ford Aviation Investment & Reform Act (2000) P.L. 106-181		Requires certain medium and large airports to submit to DOT annual competition plans to obtain federal grants and impose PFCs

Airline Deregulation Act

Name	Jurisdiction	Purpose/Comments
Airline Deregulation Act (1978)	Federal law	Airline deregulation of prices, schedules, and entry and exit; prohibits state and local governments from restricting rates, services, and public safety; and provides for airline subsidies for small communities and isolated areas
49 U.S.C. 40101(a)(6) (section of the Deregulation Act)		Deregulation Act places maximum reliance on competitive market forces and on actual and potential competition, consistent with the public safety
Essential Air Service P.L. 100-223 (1987); renewed 1997; permanent 2006		Subsidizes airline service to small communities and isolated areas
NY Airlines Inc. v. Dukes County, 623 F. Supp. 1434 (D. Mass.) (1985)	Federal court	Airports may not preempt federal domain of rates, routes, and service in denying access on the grounds that proposed service would be redundant to Incumbent's service.
Morales v. Trans World Airlines, Inc. 504 U.S. 374 (1992); 49 U.S.C. 41713(b)(1); 49 CFR 399.110 (a) (1997)		Court ruling that Deregulation Act prohibits a state or political subdivision from enacting or enforcing any law, rule, regulation, standard, or other provision having the force and effect of law relative to rates, rights, or services of air carriers providing transportation.
49 U.S.C. 41713 (b)(3); and 14 CFR 399.110 (1997)	Federal law	Airports have limited proprietary powers to impose reasonable and non-discriminatory restrictions on the use of airport, but must not be unduly burdensome to interstate commerce nor conflict with the Deregulation Act and its related statutes

APPENDIX D: FEEDER AIRLINES' ALLIANCES WITH INCUMBENTS: 1986 – 2005

Incumbent	1986	1987	1988	1990	1992	1993	1994	1998
American		Nashville Eagle (100%)	Wings West (100%)	Metro (unknown %)	American Eagle has five regionals (100%)		American Eagle largest with 4 regionals (100%)	
Continental/ Eastern/ Texas Air	Bar Harbor (34%to Eastern & Continental) Britt Airways (100%); Rocky Mt Airlines (100%)				1-2 regionals (100%)		1 or more regional (100%)	Partial ownership by Northwest
Delta	Atlantic Southeast (20%) & Comair (20%)		Skywest (20%)		Partial ownership		Partial ownership	
Northwest	Simmons (8%)				1-2 regionals (100%)		1 or more regional (100%)	Partial ownership of Continental
United					No ownership; amended pilots agreement; partial interest in Air Wisc		No ownership	
US Airways/ Piedmont	Jetstream, Suburban				Owens interest in 4 regionals/ commuters		Owens interest in 3 regionals	

Incumbent	1999	2000	2003	2004	2005	2008
American	Business Express (100% after bankruptcy)	American Eagle largest regional as holding company for Executive Airlines, Flagship Airlines, Simmons Airlines, and Wings West Airlines with restriction of ≤ 45 seats			American's labor contract limits it to 67 jets with seats between 45 – 70; but unlimited jets with seats < 45	
Continental/ Eastern/ Texas Air		Continental Express (100%) with no restrictions			Continental gradually sold ExpressJet Holdings; no labor contract restrictions	
Delta	ASA Holdings (100%)	Comair & Atlantic Southeast (100%) with restriction of < 70 seats		Atlantic Coast Airlines, a feeder airline, becomes direct competitor as Independence Air	Delta sells Atlantic Southeast Airlines Inc; discontinues Delta Express; can operate as many jets as desires so long as < 70 seats	Delta merges with Northwest
Northwest		Continental (reduce ownership to 5% for \$450 million payment)	Northwest contributes its regional airline, Pinnacle Airlines, to pension plan			Northwest merges with Delta
United		United Express (100%); can expand to 65 regional jets, subject to formula with pilots		Atlantic Coast Airlines, a feeder airline, becomes direct competitor as Independence Air	United receives bankruptcy court relief from labor restrictions on regional jets	
US Airways/ Piedmont		Restricted to 70 regional jets			US Airways merges with America West (100%); America West has no labor contract restrictions	

Note: The data are from *Standard & Poor's Airlines Industry Surveys*, by Standard & Poor's, various years, New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission), and *Commercial Aviation: Legacy Airlines Must Further Reduce Costs to Restore Profitability*, by US GAO, 2004, Washington, DC: US GPO. *Specific Notes:* Regionals are defined by DOT as earning annual revenues of <\$100 million, but > \$75 million. However, some regionals such as American Eagle earned in 2006 as much as Majors, >\$1 billion/year. For purposes of this paper, regionals refer to smaller airlines that cooperated with Incumbents to bring passengers to their Hub and Spokes.

APPENDIX E: AIRLINE MERGERS WITH MAJORS: 1979 – 2008

Airline	1979	1980	1981	1982	1985	1986	1990	1993
Republic Airlines; renamed Northwest (1986)	Southern Airways & North Central Airlines	Hughes Airwest (in financial difficulties)				Northwest		
Pan Am		National Airlines						
Western Airlines; renamed Delta (1986)		Air Florida & Air California	Air Florida & Western			Delta		
Texas Air; renamed Continental Holdings (1994)				Continental (in financial difficulties)		Eastern, People Express, Frontier, & Rocky Mt. (in financial difficulties)	SAS acquires 19.8% share (Continental in financial difficulties)	
United					Pan Am's Pacific routes (in financial difficulties)			
Southwest (New Entrant)					Muse Air Corp.			Morris Air
American						Air California from bankrupt Air Florida (in financial difficulties)		
TWA						Ozark Air Lines		
US Airways								British Airways acquires 20% interest

Airline	1998	2000	2006	2007	2008
Northwest	Continental (12.7% ownership; 46% voting interest; special times can be 50.3%)	Sell back all but 5% stake in Continental			Merger with Delta, to be renamed Delta
American	Reno Air	TWA (in financial difficulties)			
America West (New Entrant)			US Air (in financial difficulties)		
JetBlue (New Entrant)				Lufthansa acquires 19.8% interest	

Note: data compiled by author

APPENDIX F: CODE SHARE ALLIANCES WITH MAJORS: 1987 – 2006

Majors	1987	1990	1992	1994	1995	1996	1997
American (oneworld)	Air Midwest; AVAir; Chaparral; Command Airways; Executive Air Charter; Metro Airlines; Simmons Airlines; Wings West				oneworld alliance with Canadian Airlines	British Airways alliance fails to get antitrust exemption	
Continental / Eastern/ Texas Air (Wings)	<i>Continental code share:</i> Air New Orleans, Colgan Airways, Emerald Airlines, Gulf Air, Mid Pacific Air, PBA, Presidential Airways, Royale Airways, Trans-Colorado; <i>Eastern code share:</i> Air Midwest, Atlantis Airlines, Aviation Assoc, Britt Airways, Metro Airlines, Precision Valley Aviation			Code share with America West; Texas Pacific is partners with Mesa Air and owner of Continental			
Delta (SkyTeam)	Atlantic Southeast; Business Express; Comair; Skywest	Swissair & Singapore Airlines		Virgin Atlantic	Sabena, & Austrian Airlines in SkyTeam		Aero-mexico
Northwest (Wings)	Big Sky Airlines; Express Airlines; Fischer Bros; Mesaba Aviation; Simmons Airlines	KLM	Northwest & KLM operate as one without merger & with antitrust exemption				
United (Star Alliance)	Air Wisc; Aspen Airways, Westair Commuter; British Airways		Sizable commuter affiliations	Lufthansa in Star Alliance; 6 regional agreements	Air Canada & SAS		Mexicana, Thai Airways, & Varig
US Airways/ Piedmont (Star Alliance)	Air KY, Brockway Air, CC Air, Chautauqua Airlines, Crown Airlines, Henson Aviation, Jetstream Int'l, PA Airlines, Pocono Airlines, South Jersey Airways; Suburban Airlines		12 marketing affiliations	10 marketing affiliations			

Majors	1998	1999	2000	2002	2004	2006	2008
American (oneworld)	US Airways	Air Canada to oneworld from Star Alliance by takeover; British Airways		Cathay Pacific, Iberia, & Lan Chile	15% of market		
Continental/Eastern/Texas Air (Wings)		Northwest and KLM join Wings		Cancel code share with America West	Wings ended; move to Delta's SkyTeam		
Delta (SkyTeam)	United	Air France & Alitalia; Austrian Airlines moves to Star Alliance	Alitalia asked to leave; Sabena & Swiss Air leave	Northwest and Continental join Delta's SkyTeam	KLM merged with Air France and becomes member of SkyTeam, 19% of market		Merged with Northwest
Northwest (Wings)	Air China, Alaska, Horizon (owned by Alaska), & Continental Express	Northwest moves to Continental's Wings			Wings ended; move to Delta's SkyTeam	Partner Mesaba Airlines bankrupt	Merged with Delta
Southwest (New Entrant)					Code share with ATA, until 2 nd bankruptcy		
United (Star Alliance)	Delta; 16% of market	Singapore Airlines, Austrian Airlines			22% of market		
US Airways /Piedmont (Star Alliance)						US Airways merged with America West	

Note: The data are from *Standard & Poor's Airlines Industry Surveys*, by Standard & Poor's, various years, New York: Standard & Poor's (Copyright by Standard & Poor's. Used by permission); "America West Sparks Airfare War," by M. Trotman, *The Wall Street Journal*, 2002, p. A3; and "Antitrust Laws an Issue in Airline Alliances," by L. Zuckerman, *The New York Times* (Travel Section), 2000, p. 3. *Specific Notes:* Regionals are defined by DOT as earning annual revenues of <\$100 million, but > \$75 million. However, some regionals such as American Eagle earned in 2006 as much as Majors, >\$1 billion/year. For purposes of this paper, regionals refer to smaller airlines that cooperated with incumbents to bring feed to their Hub and Spokes. Market share refers to global industry capacity.

APPENDIX G: GATE USAGE PRACTICES AND LEASE EXPIRATIONS AT LARGE AIRPORTS – 1998

Airport	Dominant Airline	Exclusive Use Gates	Preferential Shared Use Gates	Airport Controlled Gates	Type of Lease	Lease Expiration	Lease Term (year)
Atlanta	Delta	125	0	46	Compensatory/MII	2012	30
Charlotte	US Airways	44	0	0		2016	
Cincinnati	Delta	67	53	0	Residual/MII	2015	45
Dallas Ft. Worth	American & Delta	112	0	8		2009	35
Detroit	Northwest	56	26	6	Residual/MII	2016	16
JFK (slot-controlled)	American & Delta	99	14	0	Compensatory	2015	17
La Guardia (slot- & perimeter-controlled)	American, Delta, & US Airways	60	5	7	Compensatory	1998	1
Minneapolis	Northwest	70				2015	
National (slot- & perimeter-controlled)	American, Delta, & US Airways	0	44	0		2004	25
Newark (reinstated as slot-controlled)	Continental	79	15	0	Compensatory	2018	20
O'Hare (slot-controlled)	American & United	149	26	8	Residual/MII (United)	1999 (United)	33
Pittsburgh	US Airways	89	1	10	Residual/MII	2018	30
Salt Lake City	Delta & Southwest	49	20	3	Compensatory	2003	25
Total		999	204	88			
Percentage		77%	16%	7%			Average 25 year

Note: The data are from *Airport Business Practices and Their Impact on Airline Competition*, by FAA/OST and Airport Council International – North America, 1999, Washington, DC: US GPO, pp. 87-88 and 91-92, Tables A-3, A-4, and B-1. *Specific Note:* Gates expire at varying times with expiration date listed for the largest blocks of gates.

APPENDIX H

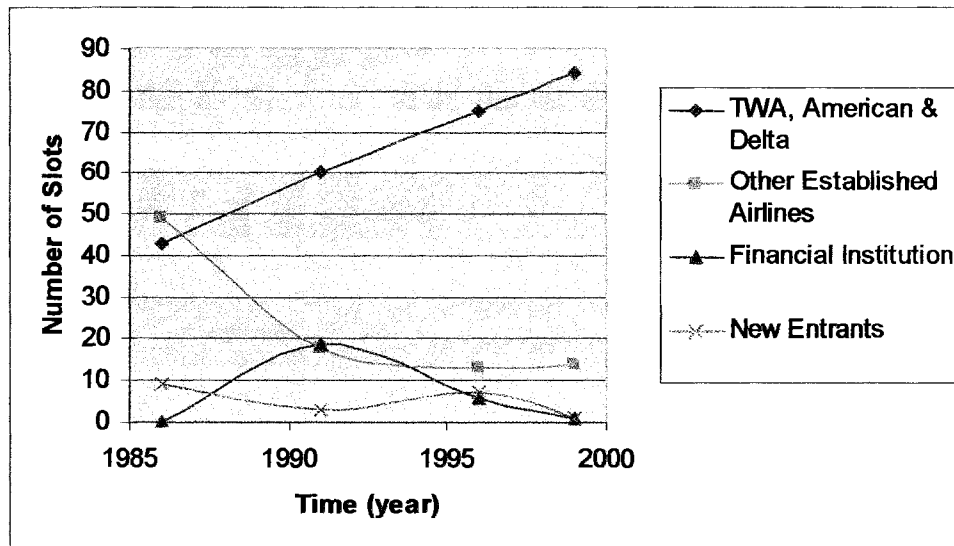
SLOT-CONTROLLED AIRPORTS

Appendix H discusses the five slot-controlled airports: JFK, La Guardia, National, Newark, and O'Hare Airports. These five airports were slot-controlled under the FAA High Density Rule of 1969 because they were located in dense urban areas with little room to expand, and their congestion threatened the orderly movement of airplanes and passengers within the national airspace. Newark Airport was subsequently removed from slot-control in 1970, but because of increasing congestion in the New York - New Jersey area, is proposed to once again be under some sort of slot control by the FAA. Slot control means that a specific landing or takeoff "slot" at a specific time and day is granted to a specific airline at an airport. Without enough slots, an airline may not operate at that airport. A complete discussion of slot-controlled airports is covered in Chapter 9 because of the antitrust issues slot controls raise. Appendix H covers slot-controlled airports in more depth and is meant to supplement Chapter 9.

JFK Airport, NY (Slot-Controlled)

Figure H1 shows the increase in control of slots at JFK Airport by American, Delta, and TWA versus the decline in control of slots by other established airlines, financial institutions, and New Entrants. Slots were so valuable that they could be collateralized for loan purposes. In 1999 TWA held its

Figure H1
American, Delta, and TWA's Slots at JFK Airport: 1986 – 1999



Note: The data from Airline Deregulation: Changes in Airfares, Service Quality, and Barriers to Entry, by US GAO, 1999, Washington, DC: US GPO, Table 3, p. 19.

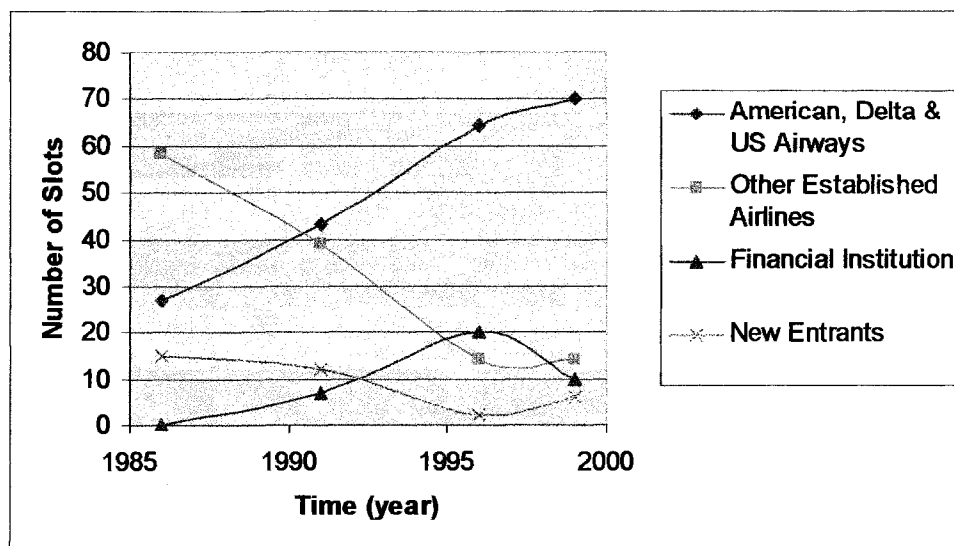
slots in a trust with First Security National Bank that provided it a loan. After several bankruptcies, financial institutions have become holders of record for some slots. Delta and TWA each acquired additional slots as a result of mergers with Western and Ozark Air Lines, respectively. American, Delta, and TWA increased the number of their slots by 95% from 43 in 1986 to 83 in 1999. During the same period, New Entrants' slots declined from nine to one. American agreed to purchase TWA in 2000, effectively eliminating one competitor and further consolidating its control over JFK Airport. The DOJ approved the merger based on the poor financial condition of TWA, including its third bankruptcy. Currently, American is in the midst of a major terminal expansion at JFK Airport to be

completed in 2008. JetBlue, a New Entrant, is headquartered at JFK Airport and has undertaken an \$800 million reconstruction of TWA's former terminal (Maynard, 2008b). It recently sold a 19.8% stake of itself to Lufthansa, who uses JFK Airport as its US hub.

La Guardia Airport, NY (Slot- and Perimeter-Controlled)

Figure H2 shows American, Delta, and US Airways' slots at La Guardia Airport. Texas Air's subsidiary, New York Air, demanded and received slots when it started its own service, challenging Eastern's Shuttle between Boston, La Guardia, and National Airports in the early 1980s. American, Delta, and US Airways increased their slots by 159%, or from 27 to 70 slots, from 1986 to 1999

Figure H2
American, Delta, and US Airways' Slots at La Guardia Airport: 1986 – 1999



Note: some airlines are bankrupt and financial institutions own the slots. US Airways declared bankruptcy in 2002 and 2004 and merged with America West in 2006. The data from *Airline Deregulation: Changes in Airfares, Service Quality, and Barriers to Entry*, by US GAO, 1999, Washington, DC: US GPO, Table 3, p. 19.

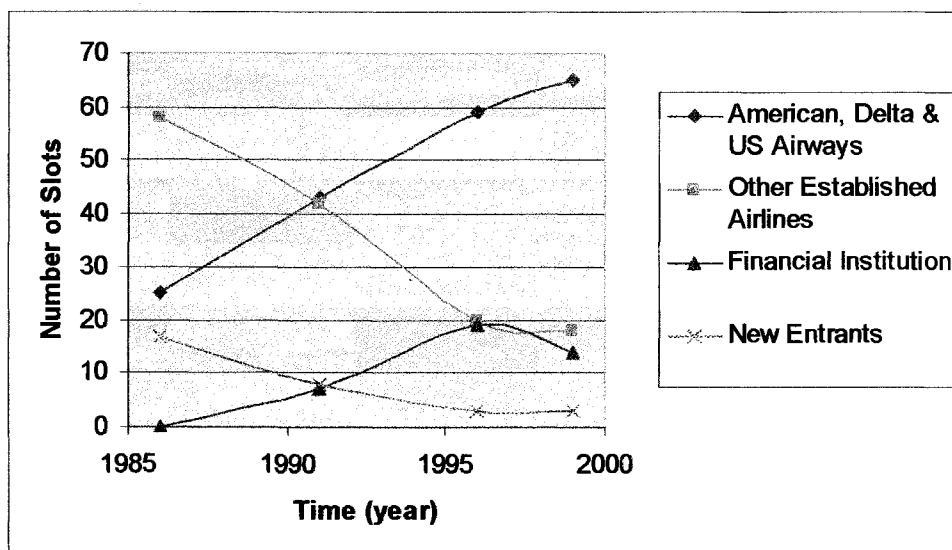
as they took advantage of the bankruptcies of Texas Air's subsidiaries Eastern, New York Air, and Continental; Pan Am; and various New Entrants. New Entrants' slots decreased from fifteen to six during the same time period. When Texas Air acquired Eastern in 1986, it sold its 76 excess slots to weak competitor Pan Am. When slots become available for sale, they are generally sold to weaker Incumbents: United had not sold a slot at La Guardia Airport for three years until it sold slots to US Airways (US GAO, 1996). Following the 9/11 terrorist attacks and recession of 2001, US Airways filed for bankruptcy in 2002 and 2004, merged with America West in 2006, and caused slot ownership to change once again.

La Guardia Airport has 60 exclusive use gates, 5 preferential shared use gates, and 7 airport controlled gates (see Appendix G). PATH, the airport authority, does not limit sublease charges for New Entrants and has refused Signatory Lessee status to airlines because their operations did not meet minimum standards due to the airport's own limitations. Efforts by New Entrants to obtain slots from DOT were rejected under the Federal Aviation Reauthorization Act of 1994 which directed DOT to grant slot exemptions (see Chapter 9).

National Airport, Washington, DC (Slot- and Perimeter-Controlled)

National Airport's slot ownership is shown on Figure H3 for American, Delta, and US Airways. National Airport's slots were particularly uncompetitive, with independent regionals' slots decreasing to 2%, the largest decline for all four

Figure H3
American, Delta, and US Airways' Slots at National Airport: 1986 – 1999



Note: some airlines are bankrupt and financial institutions own the slots. US Airways declared bankruptcy in 2002 and 2004 and merged with America West in 2006. The data from *Airline Deregulation: Changes in Airfares, Service Quality, and Barriers to Entry*, by US GAO, 1999, Washington, DC: US GPO, Table 3, p. 19.

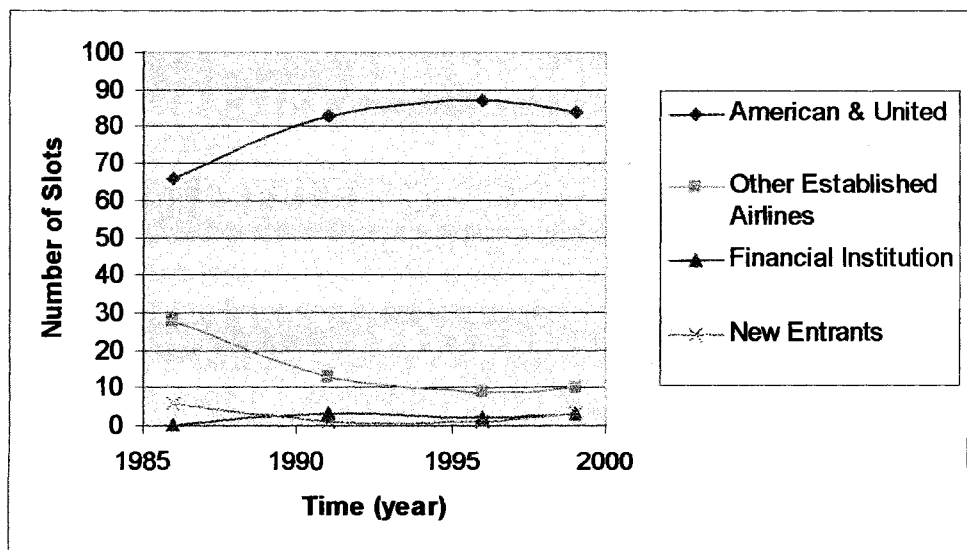
slot-controlled airports as of December 1988 (US GAO, 1990a). American, Delta, and US Airways continued their domination of slots at National Airport as they increased their number of slots by 160%, from 25 in 1986 to 65 slots in 1999. When slots were sold, they usually were sold to weaker Incumbents: United, who had not sold a slot at National Airport in three years, sold them to US Airways (US GAO, 1996). Subsequently, US Airways filed twice for bankruptcy and merged with America West in 2006. Unlike the other slot-controlled airports, National Airport was not part of the effort to increase new entry at slot-controlled airports under the Federal Aviation Reauthorization Act of 1994. In fact,

Congress passed the Metropolitan Washington Airports Act of 1986 which permanently restricts the number of flights at National Airport. All of the gates at National Airport are preferential shared use gates (see Appendix G) and airport authorities limit sublease mark ups.

O'Hare Airport, Chicago, IL (Slot-Controlled)

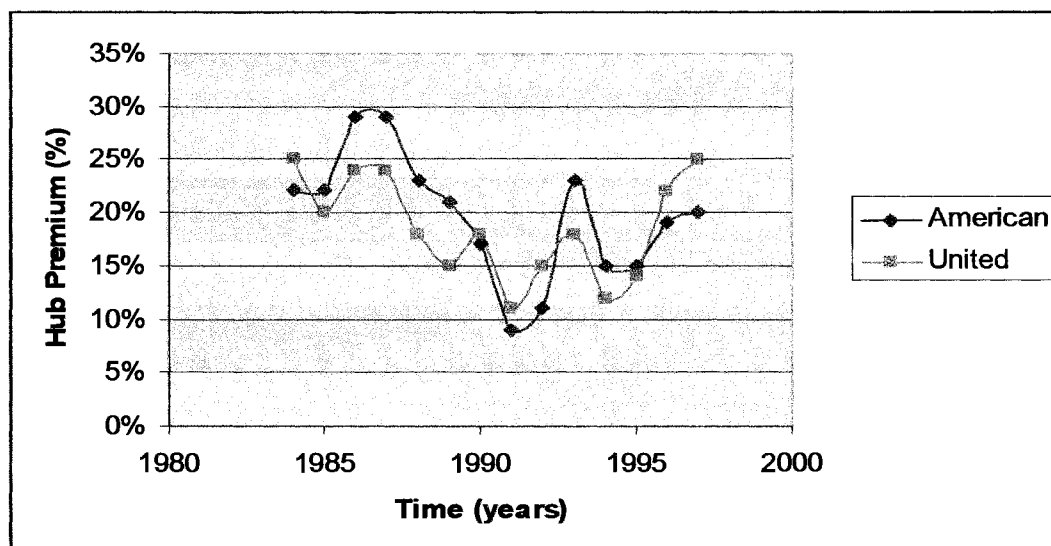
O'Hare Airport saw the smallest increase in control by its Incumbents, American and United, a 27% increase from 1986 to 1999, even though United had not sold a slot at O'Hare Airport in four years (US GAO, 1996). American and United already had hubs at this airport prior to Deregulation and they increased their control of slots from 66 to 84 during the study period as shown in Figure H4.

**Figure H4
American and United's Slots at O'Hare Airport: 1986 – 1999**



Note: some airlines are bankrupt and financial institutions own the slots. The data from Airline Deregulation: Changes in Airfares, Service Quality, and Barriers to Entry, by US GAO, 1999, Washington, DC: US GPO, Table 3, p. 19.

Figure H5
American and United's Hub Premium at O'Hare Airport: 1984 – 1997



Note: The data are from S. Borenstein's presentation to the Transportation Research Board Study Committee on Airline Competition, Jan. 1999, Table 2, and referenced in *Predatory Practices in the U.S. Airline Industry*, by C. Oster, Jr., and J. Strong, 2001, Bloomington, IN: Indiana University, Table 6 and Appendix B.

O'Hare Airport saw a decline of New Entrants' slots from six to three from 1986 to 1999. With the increase in slots controlled by American and United, hub premiums or above industry rents were achieved by the Incumbents as shown in Figure H5 and as calculated by Borenstein (Oster & Strong, 2001). The decline in hub premiums beginning in 1987 mirrored the stock market drop of 1987 and the recession of 1990 – 1991, as many business travelers use this airport. However, the hub premium during the entire study period never declined to less than 9%. As typical with close rivals, American and United's hub premiums closely matched each other. The recovery of hub premiums at O'Hare Airport following

the 1990 –1991 recession matched the period of détente as discussed in Chapter 6.

DOT rejected an application from Western Pacific in 1995 for four slots to start service between Colorado Springs and O'Hare Airport (US GAO, 1996). DOT said in its ruling that United already provided nonstop service, and concluded that exceptional circumstances to create additional slots did not exist. DOT officials told GAO (1996) that Western Pacific's access to Midway Airport provided Western Pacific an adequate alternative to O'Hare Airport. In 2003 American and United released some slots in an agreement with DOT to reduce congestion. American and United later complained that some small New Entrants increased their flights, negating their congestion-relief efforts (Wald, 2007b). As shown in Appendix G, O'Hare Airport had 149 exclusive use gates, 26 preferential shared use gates, and 8 airport controlled gates.

Newark Airport, NJ (Proposed Slot-Controls)

Newark Airport, one of Continental's hubs, is managed by PATH along with La Guardia and JFK Airports. While Newark Airport was slot-controlled from 1969 to 1970, it was subsequently removed from slot control. Currently, the FAA proposes slot controls for 2008. Its close proximity to La Guardia and JFK Airports raises concerns that failure to control congestion at Newark Airport will cause severe congestion in the New York – New Jersey air space (Wald & Belson, 2007). Therefore, for this study, Newark Airport is included as a slot-controlled airport. The GAO (Senate Committee *Aviation competition: Challenges*

in enhancing competition in dominated markets, 2001) reported that New Entrants had difficulties accessing Newark Airport. This Appendix has already reviewed the policies of PATH as they apply to La Guardia and JFK Airports. In particular, FAA/OST investigators found that AirTran sought to provide limited service from Newark Airport to Atlanta Airport and that, "No incumbent airline would sublease a gate to AirTran ..., despite the fact that some gates were not, according to data gathered by AirTran, ... being used" (US FAA/OST, 1999a, p. 80). AirTran requested PATH's assistance but PATH authorities stated that no gates were available and that it was congestion impacted. AirTran turned to DOT for assistance and eventually gained access to Newark Airport (US FAA/OST, 1999a). The FAA/OST (1999a) study reported that PATH was uncooperative in identifying available gates for New Entrants and both PATH and Incumbents were reluctant to offer long term leases or subleases to New Entrants. JetTrain initially secured gates at Newark Airport from United at times that did not conflict with United's schedule, and tried to get three more gates from United. Before JetTrain could obtain financing, however, another established airline subleased United's gates (US GAO, 1996). JetTrain's Vice President of marketing and planning said the uncertainties associated with obtaining adequate access to gates seriously affected JetTrain's ability to grow and compete at Newark Airport and eventually JetTrain exited Newark Airport completely (US GAO, 1996).

Appendix G shows Newark Airport leased 79 exclusive use gates and 15 preferential shared use gates, with most gates leased until 2018.